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ABSTRACT

Presented is an information package designed to answer questions regarding the use of microteaching and the Far West Laboratory's Minicourses. The package includes bibliographies concerning questioning teachniques, oral language development, tutoring, and the use of interaction analysis. Anslysis papers detail various minicourses and give a general overview to the topic. (JB)

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TEACHER TRAINING THROUGH THE MINICOURSE

An information package designed to answer questions regarding the use of microteaching and the Far West Laboratory's Minicourses

SCOPE OF INTEREST NOTICE
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This package includes

Guides to Specific Information in the Package:
- "A Guide for Package Users"
- "Availability of Original Documents Cited in TIS Analysis Papers and Bibliographies"

Bibliographies:
- "Questioning Techniques"
- "Questioning Techniques: Supplement"
- "Oral Language Development"
- "Individualizing Instruction in the Kindergarten"
- "Tutoring as a Technique for Individualizing Instruction in Mathematics"
- "Microteaching"
- "Interaction Analysis as a Tool for Teacher Training"

Analysis Papers:
- "Minicourse 1: Effective Questioning--Elementary Level"
- "Minicourse 2: Developing Children's Oral Language"
- "Minicourse 5: Individualizing Instruction in Mathematics"
- "Minicourse 8: Organizing Independent Learning, Primary Level"
- "Minicourse 9: Higher Cognitive Questioning"
- "An Overview of the Minicourse Model"
- "Research Related to the Minicourse Model"
- "Microteaching"
- "Equipment for a Microteaching Installation"

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A GUIDE FOR PACKAGE USERS

To assist you in using this package, materials relating to each minicourse have been printed on color-keyed paper:

Minicourse 1--pink
Minicourse 2--green
Minicourse 5--gray
Minicourse 8--blue
Minicourse 9--yellow

The questions answered below are some that might concern teachers and administrators considering installation of a minicourse. References given are to materials in this information package.

1. *How does the minicourse operate? What training procedure is used?*

   See MINICOURSE INSTRUCTIONAL SEQUENCE on pages 2-3 of "An Overview of the Minicourse Model" and "Microteaching: An Analysis Paper."

2. *What research is available to support the process of microteaching?*

   For summaries of research see:
   "Microteaching: An Analysis Paper," pages 3-5
   "Research Related to the Minicourse Model"

3. *How do I acquire minicourse materials?*

   Minicourse materials (films, handbooks, evaluation sheets) will be supplied to the local Teacher Center through Texas Educational Renewal Center (TERC).

4. *What equipment is needed and how much will it cost?*

   See "Equipment for a Microteaching Installation."

5. *What human resources are needed?*

   a. A coordinator to help solve administrative and operational problems as they arise. The coordinator should be the "change agent" for the local installation and its liaison with TERC and the local Teacher Center.

   b. The building principal to select teachers for the program, set up schedules, and make building space available if training is to take place on school premises.

   c. A technician (media teacher, A-V expert) to train teachers in the use of equipment and to keep equipment in operating condition.

d. The teachers to be trained.

e. Pupils for microteaching sessions.

f. An observer for each precourse and postcourse taping session to record the number of volunteers and non-volunteers answering questions.

g. Raters for pre- and postcourse tapes will be supplied by TERC.

6. *How much teacher released time is necessary?*

The minicourse takes approximately 75 minutes per day for each teacher for 15 days. In addition each teacher will need released time for pre- and posttaping and instruction in the use of videotaping equipment. Substitutes will be necessary unless scheduling is flexible enough to free participating teachers for the time required.

7. *How much teacher preparation time is needed?*

See MINICOURSE INSTRUCTIONAL SEQUENCE, pages 2-3 of "An Overview of the Minicourse Model," (particularly first and second days).

8. *Will teachers be "tested" or "evaluated" in any way?*

Teachers will evaluate their own progress by viewing tapes of their microteaching lessons. Self-evaluation instead of supervisor evaluation is an important part of the minicourses and a specific advantage of the microteaching technique.

9. *How much physical space is needed?*

Space must be provided for teachers to view instructional films and conduct videotaped microteaching lessons. The videotaping site should be set up for four to five pupils and a teacher with appropriate camera, recording, and playback equipment.

10. *How can I obtain more information on microteaching and minicourse procedures?*

See TIS bibliographies:
"Microteaching"
"Interaction Analysis as a Goal for Teacher Training"

11. *How can I obtain information on specific minicourses?*

See appropriate TIS papers and bibliographies. Consult the color chart above.

QUESTIONING TECHNIQUES

An Annotated Bibliography

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References from *Research in Education*
are from 1968-September, 1971

ERIC Descriptor searched:
Questioning Techniques

Related ERIC descriptors which might be searched for more information or a more complete bibliography:

Inquiry Training
Cognitive Processes

November, 1971

DOCUMENTS

Adair, Charles H; Kyle, Allan R. *Effects of Feedback on Teacher Behavior. An Exploration into the Use of Videotaping in Teacher Education Programs.* Atlanta: Southwestern Education Laboratory, 1969. ED 035 592.

Study which found that videotape feedback was a particularly effective method of changing teacher questioning behavior.

Bloom, Benjamin S. (Ed.). *Taxonomy of Educational Objectives: Handbook I: Cognitive Domain.* New York: David McKay, Inc., 1956.

Source of most widely used classification system for classroom questions and pupil cognitive processes.

Borg, Walter R.; and others. *The Minicourse: A Microteaching Approach to Teacher Education.* Beverly Hills: Macmillan Educational Services, Inc., 1970.

A handbook to the Minicourses. Gives research background, rationale for each minicourse. In addition, Borg describes in detail the developmental process for Minicourse I. Other minicourses ready for dissemination are also described.

Clegg, Ambrose A., Jr; and others. "Teacher Strategies of Questioning for Eliciting Selected Cognitive Student Responses." Paper presented at American Educational Research Association annual meeting, February 1969. ED 031 455.

Recent studies, showing that the majority of questions asked by teachers elicit little more than memorized answers from students, indicate that more effective teacher training in questioning techniques is needed. One possibility is that teachers can be trained to use certain verbal cues in their questions which indicate the kind of cognitive behavior needed by the student to answer appropriately.

Clegg, Ambrose A., Jr.; and others. *Training Teachers to Analyze the Cognitive Level of Classroom Questioning.* Research Report No. 1. Amherst: University of Massachusetts, School of Education, Applied Research Training Program, June 1967.

Cunningham, Roger T. "A Descriptive Study Determining the Effects of a Method of Instruction Designed to Improve the Question-Phrasing Practices of Prospective Elementary Teachers." Unpublished dissertation. Indiana University, 1968.
ED 032 252.

Study of an experiment that sought to cause change in 40 student teachers from asking many low level to more high level questions. Findings led to conclusions that ability of prospective teachers to construct a greater proportion of effectively phrased questions can be improved, that prospective teachers can learn to construct more divergent questions in science, and that a method of instruction employing analysis of videotaped classroom lessons can be effective in causing such change.

Dodge, G. G.; Pinney, R. H. "Variations of Practice Location and Supervision in an Inservice Training Program." Unpublished Manuscript. Minneapolis: Upper Mid-West Regional Educational Laboratory, May 1969.

Farley, George T.; Clegg, Ambrose A., Jr. "Increasing the Cognitive Level of Classroom Questions in Social Studies: An Application of Bloom's Taxanomy." Paper presented at American Educational Research Association annual meeting, February 8, 1969, Los Angeles.
ED 034 732.

In a study undertaken to determine the usefulness of Bloom's taxonomy as a stimulus for improving teacher questioning practices, it was found that the group receiving training in Bloom's taxonomy showed significantly more higher level questions than control group.

Friebel, Allen C.; Kallenbach; W. Warren. "Effects of Videotape Feedback and Microteaching as Developed in the Field Test of Minicourse I with Student Teachers." Paper presented at California Educational Research Association Meeting, March 15, 1969, Los Angeles.
ED 031 429.

Study conducted to determine to what extent student teaching behavior can be changed as a result of Minicourse I. Found that behavior of student teachers is changed. Microteaching and videotaping apparently are not necessary.

Foster, G. *A Final Evaluation of the Curricula Improvement Center, Elementary and Secondary Education Act, Title III, ESEA Project.* Punta Gorda, Florida: the Center, 1969.

Gagnon, A. Lawrence. "An Analysis of an Experimental Methodalogy for Teaching Thinking and Clarifying Values." Unpublished dissertation. Detroit: Wayne State University, 1965.

Gallagher, James J.; Aschner, Mary Jane. "System for Classifying Thought Processes in the Context of Verbal Interaction." (mimeographed) Urbana: University of Illinois, Institute for Research on Exceptional Children, 1965.

Guszok, Frank J. "Questioning Strategies of Elementary Teachers in Relation to Comprehension." Paper presented at International Reading Association annual meeting, 1968, Boston. 16p.
ED 023 542.

Reports a descriptive study of elementary teachers' tactics in teaching reading. Conclusions of the study were that teachers tend to (1) emphasize recall questions (2) utilize several controlling actions to cue, clarify, extend or shut off pupil thinking (or answering) (3) miss many opportunities for clustering questions to extend thinking.

Hoetker, James; Ahlbrand, William P., Jr. *The Persistence of the Recitation: A Review of Observational Studies of Teacher Questioning Behavior Occasional Paper Series, Number 3.* St. Ann, Mo.: Central Midwestern Regional Educational Laboratory, 1968.
ED 036 511.

This report presents a chronological review (1893 to 1963) of formal and informal classroom observational studies which show that teachers talk during the majority of classroom time, asking or reacting to factual questions posed to students.

Konetski, Louis C. *Instruction on Questioning.* Baltimore: Morgan State College, Department of Science Education, 1970.
ED 040 040.

Study of the effects of two instructional strategies on three aspects of preservice science teacher behavior: (1) number of divergent and evaluative questions asked, (2) percentage of such questions (3) total number of questions asked.

Ladd, George Thomas. "Determining the Level of Inquiry in Teachers' Questions." Unpublished dissertation. Bloomington: Indiana University, 1969.
ED 049 053. Not available through ERIC.

Study analyzed teacher questioning and found student achievement was significantly affected by the teacher's inquiry level.

Pate, Robert T. *Inquiry Patterns in Elementary Teaching.* Final Report. Wichita, Kansas: Wichita State University, 1969.
ED 034 738.

A study conducted over a period of one year led to conclusions that: (1) the individual teacher does exhibit patterns in questioning over 1 year's sampling; (2) there is no apparent general pattern exhibited by all teachers; (3) some specific patterns are exhibited by many teachers which are consistent throughout the year.

Rogers, Virginia M.; Davis, O. L., Jr. "Varying the Cognitive Levels of Classroom Questions: An Analysis of Student Teachers' Questions and Pupil Achievement in Elementary Social Studies." Paper presented at American Educational Research Association annual meeting, 1970, Minneapolis. 16p.
ED 039 189.

Report of a study that sought to determine whether student teachers' questioning strategy can be modified to include more higher cognitive questions and whether student achievement was higher in classes where teachers asked such questions. Findings were that student teachers could be trained to ask higher order questions, but that student achievement under such teachers was not significantly higher. It is possible that the technique was not used long enough or that student teachers do not have enough influence to effect such change.

Sanders, Norris M. *Classroom Questions: What Kinds?* New York: Harper and Row Publishers, 1966.

Stevens, R. "The Question as a Measure of Efficiency in Instruction," *Teachers College Contributions to Education,* No. 48. New York: Columbia University, Teachers College, 1912.

Taba, Hilda; and others. *Thinking in Elementary School Children.* Cooperative Research Project No. 1574. San Francisco, California: San Francisco State College, April 1964. ED 003 285.

A study of thought processes under optimum conditions. Quality of teaching strategy was the most significant single factor influencing cognitive performance.

Ward, Phillip M. *The Use of the Portable Videotape Recorder In Helping Teachers Self Evaluate Their Teaching Behavior.* Berkeley: University of California, 1970. ED 038 365.

An extensive report of a study of questioning techniques of teachers receiving training coupled with various types of feedback. Appended are a 96 item bibliography, evaluative and criterion instruments, and self-evaluation forms.

ARTICLES

Aschner, Mary Jane. "Asking Questions to Trigger Thinking," *NEA Journal*, 50:44-46; 1961.

Corey, S. M. "The Teachers Out-talk the Pupils," *School Review*, 48: 745-52; 1940.

Gallagher, James J. "Expressive Thought by Gifted Children in the Classroom," *Elementary English*, 42:559-568; 1965.

Hunter, Elizabeth. "The Effects of Training in the Use of New Science Programs Upon Classroom Verbal Behavior of First Grade Teachers as They Teach Science," *Classroom Interaction Newsletter*, 4:3-4, May, 1969.

Klebaner, R. P. "Questions that Teach," *Grade Teacher*, 81:10; March 1964.

Schippers, John. "An Investigation of the Grade Science Classes," *Dissertation Abstracts*, 23:1032; November 1962.

Smith, B. O. "A Concept of Teaching," *Teachers College Record*, 61:229-241; 1960.

Yamada, Sochiche. "Study of Questioning," *The Pedagogical Seminary*, 20:129-186; June 1913.

QUESTIONING TECHNIQUES
A Supplementary Bibliography

of References from *Research in Education*,
October 1970-January 1972

prepared by
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March 1972

QUESTIONING TECHNIQUES

Bacon, Phillip, ed. *Focus on Geography: Key Concepts and Teaching Strategies. 40th Yearbook.* 1970. 444p.
ED 048 042 (MF only)

This yearbook consists of two parts. The first deals with concepts and techniques in geography and the second, with teaching and learning. Inquiry approach and teaching strategies are addressed in Part II.

Berthold, Jeanne Saylor, and others. *Educational Technology and the Teaching-Learning Process. A Selected Bibliography.* 1969. 59p.
ED 043 231 (MF only)

An introduction to the literature on teaching-learning process and on various new approaches in the field of teaching technology including inquiry training.

Birch, Daniel R. *Guided Self-Analysis and Teacher Education.* 1969. 46p.
ED 040 118

A study of the effect of a social studies curriculum course, self-confrontation on videotape, videotape-coding practice, and guided self analysis on the nature of teachers' questions, responses, total teacher talk, and teacher/pupil talk patterns.

Clegg, Ambrose A., Jr.; Sebalt, Alberta P. "Testing for Concept Learning at Higher Cognitive Levels." Paper presented at AERA Symposium, March 1970, Minneapolis. 20p.
ED 041 791

The purpose of this study was to develop evaluation procedures and to test the evidence of concept learning at various cognitive levels in an experimental social studies curriculum. Students who had been given instruction in cognitive levels performed well on higher level questions.

Clements, H. Millard; and others. *Social Study: Inquiry in Elementary Classrooms.* 1966. 411p. (Available from the Bobbs-Merrill Company, Inc., Kansas City, Missouri, $6.50).
ED 052 092 Not available from ERIC.

This book has four major parts: I. Social Study; II. The Challenge of Teaching; III. Tasks of Instruction: and, IV. Speculative Resources. Describes ways to work with children that are politically possible, educationally practical, and that stress an encounter with study that is powerful in its intellectual significance.

Culbert, John; and others, compilers. *Social Studies Concepts and Generalizations: A Framework for Curriculum Development.* 1968. 62p.
ED 051 008

The goal of this booklet is to identify and present essential concepts and generalizations within the social studies. These should be the framework for an interdisciplinary, cross-cultural approach that uses the inquiry method.

David, O. L., Jr.; and others. *Studying the Cognitive Emphases of Teachers' Classroom Questions.* 1969. 12p. (Available in *Educational Leadership*, vol. 26, No. 7, April 1969).
ED 052 158 Not available from ERIC.

Study of cognitive levels of questions led to development of a questioning strategies observation system designed to be used with live observation and with recordings of teachers' verbal behavior in the classroom.

Gross, Richard E.; Muessig, Raymond H., eds. *Problem-Centered Social Instruction Approaches to Reflective Teaching.* 1971. 102p.
ED 051 058 (MF only)

This report deals with specific whats, whys, how, and whens of problem solving in social studies at the elementary and secondary school levels and makes a case for increased use of the inquiry method and this type of program organization.

Hunkins, Francis P. "Questions About Questions in Social Studies." Paper presented at AERA National convention, March 1970, Minneapolis. 10p.
ED 042 659

Expository teaching in new social studies programs is based on several unproven assumptions,one of which is that teachers and pupils ask questions of a high cognitive level (research and observation supports the opposite view). Proposes a study to test whether inservice training in questioning strategies will alter teacher questioning techniques and whether this results in improved pupil achievement.

Innovations in the Elementary School. The Report of a National Seminar. An IDEA Occasional Paper. 1971. 32p. (Available from I/D/E/A, Mail Orders, P.O. Box 628, Dayton, Ohio 45419).
ED 052 539 Not available from ERIC.

Discussion of innovations currently available and the steps that should be taken by elementary schools to supplant the teaching of facts with instruction in problem solving skills.

Massialas, Byron G.; and others. *Structure and Process of Inquiry into Social Issues in Secondary Schools. Volume 3, Social Issues Classroom Discourse: A Study of Expository, Inquiry Non-Probing Inquiry Probing Classes.* 1970. 217p.
ED 052 124

Report of a study to determine effective teaching strategies and practices in secondary social studies classroom discussions of social issues.

McKeown, R. J. "A Study of Affective Response to Selected Attitude Objects Encountered in Synthesis and Non-Synthesis Task Oriented Social Studies Programs." Paper presented at the annual convention of the National Council for the Social Studies, November 24, 1970, New York, N.Y. 10p.
ED 048 083

The work is the report of a study concerning the impact of the inquiry method of teaching on affective as opposed to cognitive achievements.

"Parameters of Individualization. Part II: Problem Solving Behavior." *Abstracts of Educational Research*, Volume IV, Number 2. 1969. 51p.
ED 051 530

Selected studies and a bibliography which are helpful in developing instructional methods which take into account individual differences in problem solving behavior compose the bulk of this report.

Sprague, Nancy Freitag. "Inquiry Dialogue in the Classroom." Paper presented at the American Educational Research Association annual convention, February 1971. New York, New York. 37p.
ED 049 143

Report of a study that found: (1) the level of student participation was greater in inquiry classes, (2) teachers tend to ask more questions and used more student ideas in inquiry classes and, (3) the main aspect of teacher influence was the type of questions asked.

Tinsley, Drew C.; and others. "Cognitive Objectives Revealed by Classroom Questions in Process-Oriented and Content-Oriented Secondary Social Studies Programs." Paper presented at AERA annual meeting, March 1970, Minneapolis. 13p.
ED 040 895

Results of this study showed that lower level cognitive questions were asked most frequently by both teachers and pupils and that teachers asked 3 times as many questions as students.

ORAL LANGUAGE DEVELOPMENT

An Annotated Bibliography

prepared by
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References are from *Research in Education*,
October 1970 - January 1972.

March, 1972

Alexander, Theron; and others. *The Language of Children in the Inner City.* 1968. 7p. (Available in *Journal of Psychology*, 68: 215-21. March 1968). Not available from ERIC.
ED 041 893

Study determined that a significant change in vocabulary occurred among children tested at the beginning and end of a Headstart program. Results also showed that boys made significantly higher gains.

Anastasiow, Nicholas. *Oral Language: Expression of Thought.* Bloomington: ERIC Clearinghouse on Reading, 1971. 49p. (Available from International Reading Association, 6 Tyre Ave., Newark, Del. 19711, $1.50).
ED 054 393 Not available from ERIC.

A paper based on the following premises: the child's language reflects his thought processes and level of development. Learning activities which incorporate emotional, motor, cognitive, and language expression have greatest potential for maximizing child's intellectual growth. The teacher must accept the child's dialect, but must also provide a model of Standard English.

Cozden, Courtney B. *Language in Early Childhood and Reading: A Review for 1969/70.* May 1970. 49p.
ED 043 867

Reviews significant research in 1969 in the field of oral language in early childhood and reading. Bibliography is included.

Chandler, William J.; and others. *An Approach to Teaching English Usage.* 1969. 31p.
ED 048 146

Guide for K-12. Activities of the program are based on the study of language as it is used by groups of people in various kinds of environments and on the differences between speech and writing. Guide is not prescriptive but intended to serve as the basis for local curriculum projects.

Curriculum Change Through Nongraded Individualization. A K-3 Reading Program. March 1971. 54p.
ED 053 898

An individualized, nongraded reading program that seeks to develop in the child prereading experiences, language experiences, expanded vocabulary, reading-thinking activities, and independence, enjoyment, and versatility in reading.

Devito, Joseph A. *Speech and Language: Development and Acquisition, A Bibliography.* 1970. 30p.
ED 045 638

Lists 423 books and journal articles published between 1937 and 1970. Not available in hard copy due to marginal legibility of original document.

Early Education Screening Test Battery of Basic Skills Development; A Study of Test Selection. January 1969. 24p.
ED 043 684

A 30-minute screening battery of tests and subtests. Measures cognitive, motor, auditory, visual, visual-motor coordination, and language development. Drawn from complete 90-minute battery used in USOE prekindergarten-kindergarten research.

An English Language Arts Curriculum Guide: K-3 Volume 1. 1969. 390p. (Hard copy available from Carmen Fabian, West Lafayette Community Schools, 141 Andrews Place, West Lafayette, Indiana 47906. $4.95).
ED 044 402 (Microfiche only)

A language arts curriculum guide designed for teaching the culturally advantaged pupil of above-average intelligence suggests learning processes that allow pupils to order their environment. Lists of objectives, materials, and activities included.

English Language Arts Framework: Kindergarten Through Grade 12. June 1970. 158p. (Available from Office of the Superintendent of Public Instruction, Utah State Board of Education, Salt Lake City, Utah 84114, $1.50).
ED 045 677 Not available from ERIC.

This curriculum guide focuses on the teacher's understanding of each student as a learner. Some of the topics explored are: teaching strategies for creative learning and thinking; an approach to learning through sensory perception; behavioral objectives charted from K-12.

Evans, Ellis D. *Contemporary Influences in Early Childhood Education.* 1971. 377p. (Available from Holt, Rinehart and Winston, Inc., 383 Madison Avenue, New York 10017, $7.50).
ED 053 797 Not available from ERIC.

The subject of this book is preprimary educational programs. The book communicates to readers the great variety in educational and psychological thinking about children in the early 1970's. It maintains a consistent research perspective.

Francis, Azalia Smith. "The Development and Preliminary Field Testing of a Multisensory Language Development Program for Kindergarten, First Grade and Fourth Grade." Doctoral dissertation, Peabody College for Teachers, 1970, 346p. (Available from University Microfilms, P.O. Box 1764, Ann Arbor, Michigan 48106. MFilm $4.00, Xerography $10.00).
ED 050 096

Not available from ERIC.

Report of the development and preliminary field testing of an oral language program designed to utilize a multisensory method based on the theories of Piaget, Hebb, and Montessori. Program is linguistically structured to attack the 10 debilitating speech features found to be common to culturally disadvantaged children of the southeastern U.S.

Gordon, Sandra L.; Fulton, Jean. *The First 10 Days: Interest Centers.* June 1970. 28p.
ED 041 846

A manual on how to prepare and use interest centers designed to meet the needs of the other children in the class while a small group works with the teacher on the Oral Language Program. Detailed lesson plans are provided for the first 10 days with suggestions for further activities.

Harner, Vivian. *An Introductory Sequence of Lessons to Accompany an Oral Language Program. Pre-Lessons.* [n.d.]. 22p.
ED 044 376

A manual providing a set of brief daily activities for children encountering school for the first time. Introduction points out that participating in these activities should increase the likelihood that children will feel comfortable and respond during subsequent systematic instruction in speaking and listening to standard English.

Jester, R. Emile. "Intellectual Stimulation of the Preschooler, or Reading Readiness Begins at Birth." Paper presented at the Lehigh University Reading Conference, March 27, 1971, Bethlehem, Pa.
ED 049 900

A study in which infants were provided varying amounts of intellectual stimulation. It was concluded (1) that intervention with systematic intellectual stimulation curriculum materials does make a difference in performance scores of children and (2) that the time to begin instruction in beginning reading skills is on the baby's day of birth.

Lavatelli, Celia Stendler, ed. *Language Training in Early Childhood Education.* 1971. 196p. (Available from University of Illinois Press, 54 East Gregory, Champaign, Illinois 61820, $4.00).
ED 051 881
Not available from ERIC.

The purpose of this book is to make teachers more conscious of language processes and of the components of teacher-child interactions that affect language acquisition. The papers in this volume are devoted to both the theory and practice of language training.

Lindamood, Charles H.; Lindamood, Patricia C. "Conceptualization of Auditory Patterns." Paper presented at the International Reading Association Conference, May 8, 1970, Anaheim, California. 10p.
ED 044 253

Report of a study that evaluated children's ability to conceptualize auditory pattern contrasts. The authors concluded that curriculum planning should include special attention to developing auditory conceptualization.

Lindfors, Judith. *The Michigan Oral Language Series: A Critical Review.* 1970. 74p.
ED 044 654

This review describes an oral language series which includes structural lessons for preschool and kindergarten children learning English as a second language or Standard English as a second dialect, and programs in testing and teacher training.

Natalicio, Diana S.; Williams, Frederick. *Repetition as an Oral Language Assessment Technique. Final Report.* March 1971. 154p.
ED 051 680

Aim of this study is to assess the degree to which sentence imitations of Negro and Mexican-American children (grades K-2) could be used as a basis for language evaluation. Results of the study are interpreted primarily for application in the training of personnel to undertake language evaluations of primary school children using sentence imitation materials.

Oral Language Program. [n.d.]. 16p.
ED 044 379

The Southwestern Cooperative Educational Laboratory is field testing a set of instructional materials for teaching English language speaking and listening skills in preschool and first grade classes. Oral Language Program (OLP) is directed at providing speaking ability and facility in understanding spoken English considered prerequisite to formal reading instruction.

Reeback, Robert T. *A Teacher's Manual to Accompany the Oral Language Program.* September 1968. 86p.
ED 044 368

Teacher's manual to accompany OLP. Includes description of contents of the lessons and guides to materials, preparation, native traditions, checklists, and content tests for each lesson. Appended are a reading list, a lexicon of words which appear in the program, and a materials list with index.

Robinett, Ralph F.; and others. *Interdisciplinary Oral Language Guide--Primary One. Parts Two and Three. Michigan Oral Language Series.* 1970. 239p.
ED 040 626-040 627

This language program guide is designed for teachers of primary age children whose native language is Spanish or of children who are limited in their command of standard English.

Schaefer, Earl S. "Need for Early and Continuing Education." Paper presented at the meeting of the American Association for the Advancement of Science, December 28, 1969, Chevy Chase, Maryland. 29p.
ED 040 750

Discusses the necessity for early education that is confirmed by a large body of research, particularly that which reveals the emergence of mental test score differences between children of different social classes during the crucial period of early language development, the second year of life.

Speech Education in the Public Schools. January 1967. 4p. (Reprinted from *Speech Teacher,* January 1967).
ED 043 629

Article deals with rationale for instruction in oral communication: since children who have not acquired proficiency in spoken language are handicapped in school, the development of instructional programs in oral communication is necessary at all levels.

Swickard, Sara R.; and others. *Language Arts and the Migrant Child, Diagnosis and Prescription.* 1969. 199p.
ED 040 789

Goals, activities, methods, and techniques are suggested in this document for improving instruction in the language arts for the migrant child.

Test of Oral English Production. August 1969. 55p.
ED 042 793

This is an individually administered test designed to evaluate programs that teach English as a second language, specifically the Southwestern Cooperative Educational Laboratory's Oral Language Program for children in the primary grades. A major goal of the test is to elicit responses in as spontaneous a manner as possible in order to assess the child's speech.

Thomas, Hadley A.; Allen, Harold B. *Oral English: Learning a Second Language.* 1968. 304p. (Available from the Economy Company, 1901 North Walnut, P.O. Box 25308, Oklahoma City, Oklahoma 73105.) Not available from ERIC.
ED 044 690

An audiolingual program for preschool and primary children whose native language is not English or who speak nonstandard dialects of English. Introduces basic sentence patterns and systematic practice of the sounds of English.

Yonemura, Margaret. *Developing Language Programs for Young Disadvantaged Children. Practical Suggestions for Teaching Series.* 1969. 81p. (Available from Teachers College Press, New York, N.Y. 10027, $2.50).
ED 041 075 Not available from ERIC.

Means for designing and outlining a language development program for teaching standardized English usage are described. Practical teaching techniques, games, exercises, and puppet plays are included.

Dato, Daniel P. *Research Handbook on Children's Language Learning. Preliminary Edition. Final Report.* Washington, D.C.: Institute of International Studies (DHEW/OE), 1971. 61p.
ED 053 633

This handbook serves as an introduction to the study of children's language development and as a supplementary aid in the training of research workers in the field of children's language learning.

Dunlop, Ian. *Practical Techniques in the Teaching of Oral English. Volumes 1 and 2.* 1970. 409p. (Available from Almquist and Wiksell Forlag AB, Stockholm, Sweden).
ED 043 870 Not available from ERIC.

Techniques in this two-volume book are those developed by the author during the past 12 years at the British Centre in Stockholm. Volume 1 contains descriptions of techniques of teaching oral English; Volume 2 gives examples of actual teaching material used to show how these techniques work in practice.

INDIVIDUALIZING INSTRUCTION IN THE KINDERGARTEN

An Annotated Bibliography

prepared by
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References are from *Research in Education*,
(November 1966-October 1971)

March 1972

Almy, Millie. *Spontaneous Play: An An Avenue for Intellectual Development.* 1966. 15p. (Available in *The Bulletin of the Institute of Child Study*, vol. 28 No. 2).
ED 023 444 Not available from ERIC.

A paper presenting the value of spontaneous play in a nursery school or kindergarten environment.

And All This is Reading: English Language Arts Primary Reading Handbook. 1967. 195p.
ED 044 414

Units in this handbook focus on the child as an individual--his behavior, his maturity, and his capacities for understanding, learning, and creating. Appended are suggestions for independent learning activities and a brief bibliography.

Ball, Barbara; and others. *Independent and Small Group Activities for Social Studies in the Primary Grades.* 1968. 113p.
ED 031 305

A teachers' guide which stresses geography curriculum and activities for the primary grades. It is suggested that the teacher work with one group while the other children work individually. Children first work independently for a team, and then progress to less structured small group activities

Bryan, Miriam M. *Ability Grouping Status, Impact, and Alternatives.* 1971. 15p.
ED 052 260

Ability grouping is considered in terms of its effect upon academic achievement and effective development. The following alternatives are recommended: individualized instruction, heterogeneous grouping, stratified heterogeneous grouping, team teaching, student tutoring, and early childhood education.

Cazden, Courtney B. *A London Infant School. An Interview.* 1967. 19p.
ED 027 963

An interview with the director of a British infant school--explaining the individualized program offered by her school.

Concept and Language Development. A Resource Guide for Teaching Young Children. 1968. 94p.
ED 030 472

Suggestions for working with children to provide for individual, small group, and total class instruction. Sets out activities for developing pupils' skills in vocabulary, organization of ideas, auditory and visual perception, and speech.

Ellison, D. G.; and others. *Programed Tutoring--A Teaching Aid and a Research Tool.* 1965. 54p.
ED 010 760

Ten experiments on the development and testing of the programed tutoring technique and its application to the teaching of beginning reading are summarized.

Findley, Warren G.; Bryan, Miriam M. *Ability Grouping: 1970--III. The Problems and Utilities Involved in the Use of Tests for Grouping Children with Limited Backgrounds, and Alternative Strategies to Such Grouping.* 1970. 56p. (Available from Dr. Morrill M. Hall, Director, Center for Educational Improvement, College of Education, University of Georgia, Athens, Georgia 30601).
ED 048 383
Not available from ERIC.

Alternative strategies to homogeneous and heterogeneous ability grouping are suggested and described in some detail. An extensive bibliography and a list of test references are provided.

Fowler, William. *The Design of Early Developmental Learning Programs for Disadvantaged Young Children. ERIC-IRCD Bulletin (Supplement), Volume III, Number 1A*, 4p.
ED 025 558

Recommends that an effective program in developmental learning will include small group learning situations which enable interaction with the peer reference group.

Hull, William P.; Armington, David. *Leicestershire Revisited.* 17p.
ED 029 683

Emphasis is on an environment in which a child is encouraged to learn and given freedom to do so at own rate and style. Children are regarded as individuals capable of taking an active part in their own learning.

Individualized Motor-Perceptual Study. 1968. 117p.
ED 029 692

This guide is being used in the study to determine whether working directly with kindergarten children to improve performance on motor-perceptual tasks will affect reading ability. Activities, bibliography, and checklists are included.

Lay, Margaret. *The Effect of Supplementary Small Group Experience on Task Orientation and Cognitive Performance in Kindergarten Children. A Final Report of the Kindergarten "Learning to Learn" Program Evaluation Project.* 1969. 71p.
ED 039 948 (Microfiche only)

Results of this study did not support theories on the advantages of sequential instruction or a special program of expressive activities in addition to the regular classroom program.

Lipson, Joseph I. *An Individualized Science Laboratory.* (Available in *Science and Children*, vol. 4, No. 4, December 1966).
ED 013 664 Not available from ERIC.

An experimental project to examine methods of individualizing instruction in science at the elementary level. Experiment focuses on nonreaders in grades K-3.

Model Observation Kindergarten and First Grade, Amherst, Massachusetts. 1970. 19p. (Available from Supt. of Documents, U.S. Government Printing Office, Washington, D. C. 20402).
ED 045 219 (Microfiche only)

This booklet describes the model observation kindergarten and first grade whose approach is based on the philosophy that education should be learner-centered, that children learn at different rates and only when they are ready.

Southall, Macie K. *Elementary Instruction, Leflore County School District, Mississippi: Reports of Consultants and Advisory Specialists under Planning Grant, Title III, Elementary and Secondary Education Act of 1965.* 1969. 22p.
ED 039 970 (Microfiche only)

Recommendations to help meet needs of rural children include parent education, nursery schools and public kindergarten, and individualized instruction.

UEC--Educational Day-Care Systems: *The First Comprehensive System of Early Childhood Education and Day Care Designed Especially to Strengthen the Role of the Family in Helping Children Prepare for Success in Life.* 1971. 81p.
ED 048 409

Comprehensive child development programs are based on UEC's discovery program. More than 1800 clearly stated learning objectives and more than 3600 learning task activities are available for parents and staff to assess a child's skills and concepts and provide him with individualized learning assistance.

Van de Riet, Vernon; Van de Riet, Hani. *A Sequential Approach to Early Childhood and Elementary Education, Phase I. Grant Report.* 1969. 57p.
ED 042 517

The project reported deals with the accommodation of individual learning differences, parent involvement, and small group activities. The sequential curriculum is the Learning to Learn Program.

Wang, Margaret C.; and others. *PEP in the Frick Elementary School. Interim Evaluation Report of the Primary Education Project, 1968-1969.* 1970. 48p.
ED 047 973

Main objective of the PEP is to develop an individualized early learning program for ages 3-9. PEP is attempting to create a total learning environment which will affect the growth of young children in both cognitive and psychological development.

TUTORING AS A TECHNIQUE FOR INDIVIDUALIZING INSTRUCTION IN MATHEMATICS

After School Centers Project, Final Reports. Winter 1968-1969, Summer 1969. 53p.
ED 034 013 (Microfiche only).

The programs were designed to give disadvantaged children remedial instruction in reading and mathematics as well as other curriculum areas.

Allen, Charles; and others. *Experiences in Mathematical Ideas.* 1970. 340p.
ED 046 712

This publication is designed to help teachers provide interesting and worthwhile learning opportunities for slow learners in grades five through eight. Activities suggested are of a laboratory nature and encourage participation by all students.

Becker, Jerry P.; Rogers, Lloyd V. "Research in the Teaching and Learning of Mathematics." Report on a symposium held during the annual meeting of the California Mathematics Council, December 1966, Asilomar, California. 22p. 1969.
ED 040 870

This paper reports on a symposium at which speakers and topics were: Frederick J. McDonald--"The Teaching of Mathematics"; John E. Coulson--"The Learning of Mathematics; Zoltan P. Dienes--"Research and Evaluation in Mathematics Learning."

Benzinger, Thomas L. *The Effects of Instruction on the Development of the Concept of Conservation of Numerousness by Kindergarten Children. Report from the Project on Individually Guided Elementary Mathematics Phase 20 Analysis of Mathematics Instruction.* 1970. 46p.
ED 049 821

40 kindergarten children were tested to determine the effectiveness of 12 experimental lessons on the ability of kindergarten children to recognize and conserve numerousness. Results indicate that these lessons should provide an effective supplement to formal activity with number concepts.

Beougher, Elton E. *Number Theory in the Elementary School.* 1971. 28p.
ED 053 924

This paper presents reasons for teaching topics from number theory to elementary school students. Examples from number theory discussed include history, number patterns, prime numbers, unsolved problems, and divisibility rules.

Carey, Russell L.; Steffe, Leslie P. *An Investigation in the Learning of Equivalence and Order Relations by Four-and Five-Year-Old Children.* 1968. 212p.
ED 045 178

This study is one of a series which attempts to arrive at generalizations about the learning of mathematics and the use of its terminology in the context of mathematical structure by young children. Contains a bibliography and details of the three instructional units used.

Copeland, Richard W. *How Children Learn Mathematics, Teaching Implications of Piaget's Research.* 1970. 319p. (Available from Macmillan Co., 866 Third Avenue, New York, N.Y. 10022).
ED 040 077 Not available from ERIC.

Included are the standard topics presented in the undergraduate and/or graduate course on methods of teaching mathematics in elementary education. Final chapter discusses the implications for change in the elementary mathematics curriculum.

Cox, Richard C.; Boston, M. Elizabeth. *Diagnosis of Pupil Achievement in the Individually Prescribed Instruction Project. Working Paper 15.* 1967. 41p.
ED 023 296

Discusses diagnostic, placement, and evaluative instruments of the IPI project in mathematics.

Crawford, Rudd, A., Jr. *Seeing Through Fractions, A Workbook for Students.* 1970. 107p. (Available from the Pennsylvania Advancement School, 5th and Luzerne Streets, Philadelphia, Pa. 19140).
ED 052 056 Not available from ERIC.

This workbook along with a set of transparent 2 x 3 cards was developed for use with underachieving seventh and eighth grade boys. It is designed for a 14-week term or less.

Crewson, Walter; and others. *Mathematics K-6--A Proposed Program.* 1963. 54p.
ED 002 707

Ideas to be developed in this program are to be explained first by working with objects, then with pictures, and finally with numbers. Meanings for numbers and operations are developed with objects before reaching the symbolic level.

Devenney, William S. *Final Report on an Experiment with Junior High School Very Low Achievers in Mathematics. School Mathematics Study Group Reports Number 7.* 1969. 57p. (Available from A.C. Uroman, Inc., 2085 East Foothill Blvd., Pasadena, Calif. 91109).
ED 042 630

Not available from ERIC.

The purpose of this experiment was to develop a program which would relieve low achieving junior high school students from the burdens of computation as much as possible. The author believes that the experiment did help the low achievers to learn some significant mathematics and created in them a desire to learn.

Davis, Harold S. *Independent Study, An Annotated Bibliography.* 1966. 30p.
ED 022 256

An annotated bibliography listing 150 books, pamphlets, and articles published between 1929 and 1966, with most entries dated after 1960.

Flint, Deloris. *Supplement to District Math Guide 1970-71.* 1971. 52p.
ED 052 057

This teachers' guide lists manipulative aids, audio-visual materials, and demonstration materials for use in the elementary mathematics classroom.

Frayer, Dorothy Ann. *Effects of Number of Instances and Emphasis of Relevant Attribute Values on Mastery of Geometric Concepts by Fourth- and Sixth- Grade Children (Parts 1 and 2).* 1970. 125p.
ED 040 878

Reported are the results of a study by fourth- and sixth- grade children of programed lessons dealing with geometric concepts.

Harrison, Grant Von. *Structured Tutoring.* May 1971. 17p.
ED 053 080

Structured tutoring model was designed to cope with the unique learning characteristics of low achieving primary grade children, but it can be used to teach most objectives not readily attained by students generally, at any grade level. Endorses peer tutoring.

Harvey, John G.; and others. *The Task Analysis for Developing Mathematical Processes, Arithmetic Book 20 Writing Mathematical Sentences.* 1970. 21p.
ED 050 967

Major objective of this text is to have children write and validate mathematical sentences which represent the results of the compare-and-equalize process. The complete task analysis is presented as a list of 53 objectives.

King, Irvin L. *A Formative Development of a Unit on Proof for Use in the Elementary School (Parts 1, 2 and 3).* 1970. 401p.
ED 040 876

Investigated was the feasibility of presenting proof materials to college-capable sixth-grade students. Results indicated that procedures employed were highly successful.

Lovell, Kenneth. *Intellectual Growth and Understanding Mathematics. Mathematics Education Reports.* 1971. 25p.
ED 049 069

A review of recent Piagetian research in mathematics education. The author suggests that elementary schools should be less formal, have more manipulative materials, and provide for more peer tutoring.

Ogle, John W.; Meek, Cleo M. *Mathematics Goals and Activities K-6. Part 10. Sets and Numbers.* 1970. 163p.
ED 048 148

A guide which sets out six levels in both sets and numbers. Each level has specified concepts, behavioral objectives, suggested activities and materials.

Project SOSO (Save Our Slow Ones). 1970. 6p.
ED 049 062

Described is project SOSO designed to help elementary teachers improve methods for teaching arithmetic to low achievers in the sixth grade. Uses primarily free or inexpensive materials. Preliminary results indicate improvement in student understanding and attitude.

Quilling, Mary R. *Summaries of Research and Development Activities Performed in Racine R/I Units during the 1963-67 School Year.* 1967. 12p.
ED 016 012

Activities included three experiments in individualized arithmetic instruction.

Resnick, Lauren B.; and others. *Behavior Analysis in Curriculum Design: A Hierarchically Sequenced Introductory Mathematics Curriculum.* 1970. 82p.
ED 047 954

A method of systematic behavior analysis is applied to the problem of designing a sequence of learning objectives that will provide an optimal match for the child's natural sequence of acquisition of mathematical skills and concepts. A discussion of ways in which a hierarchically sequenced early learning curriculum can be used in schools is presented.

Robinson, Inez Cooper. "The Acquisition of Quantitative Concepts in Children." 1967. 267p. (Available from University Microfilms, P.O. Box 1746, Ann Arbor, Michigan 48106).
ED 042 627 Not available from ERIC.

The purpose of this study was to explore among first grade children the relationship between achievement in mathematics and the understandings of principles of conservation, seriation, and categorization as these are defined by Jean Piaget.

Rousseau, Leon. *A Conceptual Model for the Teaching of Elementary Mathematics.* 1968. 32p.
ED 026 307

A communication model for teaching elementary mathematics. Part I deals with symbols used in teaching arithmetic. Part II discusses strategies teachers can use in the communication process--a process that depends on the use of concrete manipulatives to lead to an understanding of symbols.

School Mathematics Study Group Newsletter No. 33, Mathematics for Disadvantaged and Low Achieving Students. 1970. 11p.
ED 047 941

Mathematics for the Elementary School--Special Editions, and Secondary School Mathematics--Special Editions are described including their testing and content. Ordering information is included.

Scott, Joseph A. *The Effects on Short- and Long- Term Retention and on Transfer of Two Methods of Presenting Selected Geometry Concepts.* 1970. 163p.
ED 044 314

Study was designed to investigate the effects on immediate acquisition, retention, and transfer of expository versus discovery methods of presenting geometry concepts to sixth grade students. Results showed that method of presentation did not affect immediate acquisition or transfer but discovery mode was linked to greater retention.

Shah, Sair Ali. "Selected Topological Concepts Taught to Children, Ages Six to Nine." Paper presented at the AERA annual meeting, February 1971, New York, N.Y. 7p.
ED 049 061

Topological concepts are taught using manipulative materials for a period of 3 weeks. Author concludes that the material presented seems suitable for children in the age range studied.

Shepler, Jack L. "An Exploratory Study of the Interaction of Three Elementary Concepts of Probability with Stimuli, Socioeconomic, Grade, and IQ Differences." 1970. 46p.
ED 045 414

This study provides evidence supporting the feasibility of teaching certain probability concepts to fifth and sixth grade students.

Small, Dwain E.; and others. *The Problems of Under Achievement and Low Achievement in Mathematics Education.* 1966. 88p.
ED 010 535

Project recommendations were: (1) low achievers need to be exposed to comprehensive counseling and remedial programs based upon their individual ability levels; (2) underachievers should participate in special programs designed to reduce anxiety toward mathematics.

Suydam, Marilyn N.; Weaver, J. Fred. *Overview...Other Mathematical Topics, Set B. Using Research: A Key to Elementary School Mathematics.* 1970. 8p.
ED 047 931

This bulletin provides an overview of research studies which relate to the teaching of certain mathematical topics in the elementary school. Some of these are: measurement and geometry, graphing, numeration system, properties and relations, integers, set concepts, probability and statistics, and logic.

Uprichard, Albert Edward. "An Experimental Study Designed to Determine the Most Efficient Learning Sequence of Three Set Relations in the Preschool Years." Ph.D. Dissertation, Syracuse University, 1969. 147p. (Available from University Microfilms, P.O. Box 1764. Ann Arbor, Michigan 48106).
ED 047 942 Not available from ERIC.

The efficiency of a particular ordering of the relations, equivalence (E), greater than (G), less than (L) was evaluated in terms of time required to reach criterion, and amount of transfer. The most efficient learning sequence was in the order E, G. L.

Wagman, Harriett Gordon. "A Study of the Child's Conception of Area Measures". Ph.D. dissertation, Columbia University, 1968. 185p. (Available from University Microfilms, P.O. Box 1764, Ann Arbor, Michigan 48106).
ED 053 912 Not available from ERIC.

This study led to suggestions concerning possible modifications in the conventional mathematics program: (1) instruction in area concepts should begin in grades 2 and 3, (2) concrete materials should be used, and (3) the program should present a complete axiom set rather than a single axiom.

Wyoming Mathematics Curriculum Guide, Grades K-6. 1969. 80p.
ED 050 070

This guide contains behavioral objectives in mathematics and resources for teachers, a section which includes concrete materials for use with children, books, films, filmstrips, manipulative devices, programed instruction materials, teachers' resource materials, teaching tapes, and transparencies.

Travers, Kenneth J.; and others. *Teaching Resources for Low-Achieving Mathematics Classes. PREP-30.* (1972). 34p. (Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

Includes information on activity learning, curriculum considerations, and a bibliography of some 200 citations.

MICROTEACHING

An Annotated Bibliography

prepared by
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References from *Research in Education* are from 1968-September, 1971.

ERIC Descriptors Searched:
Microteaching
Video Tape Recordings

Related ERIC descriptors which could be searched for more information or a more complete bibliography:

Episode Teaching
Inservice Teaching
Teaching Techniques
Classroom Observation Techniques
Interaction Process Analysis

November, 1971

MINICOURSE REFERENCES

Borg, Walter R. "The Minicourse Instructional Model." Paper presented at the American Educational Research Association Meeting. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1970. ED 037 388.

Minicourse is briefly described. It goes through three field tests; it is rooted in research in education and the behavioral sciences. It is closely tuned to the realities of the classroom since it deals with specific teaching skills.

--- "The Minicourse as a Vehicle for Changing Teacher Behavior, the Research Evidence." Paper presented at the American Educational Research Association (AERA) Meeting. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1969.

This report deals with an experiment using inservice teachers and focusing on the acquisition of specific teaching skills. The report indicates that the minicourse was successful in obtaining significant behavior changes on 10 of the 12 skills taught.

Borg, Walter R.; and others. *The Effects of Videotape Feedback and Microteaching in a Teacher Training Model.* Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1968. ED 024 650.

Study dealt with Minicourse I in order (1) to estimate the degree to which practice in the microteaching format and feedback from the videotape replay influenced learning in the minicourse model and (2) to determine the effectiveness of the minicourse as a technique for changing the behavior of student teachers. The full minicourse (with microteaching and videotape feedback) was found to produce more and greater changes in behavior.

---; and others. "The Minicourse: Changing Teacher Behavior Through Microteaching." Unpublished Manuscript. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1968.

---; and others. *The Minicourse: A Microteaching Approach to Teacher Education.* (Far West Laboratory for Educational Research and Development). Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1970.

A handbook to the minicourses. Gives research background, rationale for each minicourse. In addition, Borg describes in detail the developmental process for Minicourse I: Effective Questioning at the Elementary Level. Other minicourses ready for dissemination are also described.

---; and others. "The Minicourse: Rationale and Uses in the Inservice Education of Teachers." Paper presented at the Annual Meeting of the American Educational Research Association. Chicago: February, 1968.
ED 024 647.

Main differences of Minicourse process from Stanford microteaching model discussed. Advantages of Minicourse over usual teacher training devices outlined. Discussion of research evidence for effectiveness of Minicourse I.

Friebel, A.C.; Kallenback, W.W. *Effects of Videotape Feedback and Microteaching as Developed in the Field Test of Minicourse I with Student Teachers.* Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1969.
ED 031 429.

Purpose of the study was to determine to what extent student teachers' behavior can be changed as a result of Minicourse I. Conclusion was that the Minicourse does change behavior of student teachers (although not as greatly as was expected). Student teachers do not seem to need the microteaching component.

Kelley, Marjorie. *The Teacher Education Program of the Far West Laboratory for Educational Research and Development.* Berkeley, Calif.: the Laboratory, 1967.
ED 017 501.

The focus of Far West Lab programs is on inservice education and the development of self-contained courses using microteaching (minicourses). Each concentrates on one teaching skill or technique. This is a report presented at 1967 NCTE Annual Convention.

Langer, Philip. *Minicourse: Theory and Strategy*. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1969.
ED 028 114.

Distinguishes between microteaching as process and minicourse as product. Instructional sequence is defined, and reasons for failure of traditional teacher training programs are cited. Reasons for minicourse success also given.

--- *The Range of Teaching Skills That Can Be Changed by the Minicourse Model*. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1969.
ED 032 293.

The Minicourse Model is briefly described. A summary of research findings is offered. Concentration is on Minicourse I. Others are addressed briefly.

Suffolk County Regional Center. *Microteaching and the Minicourse. A Manual for Planning and Implementation*. ESEA Title III Project Report. Patchogue, N.Y.: the Center, 1970.
ED 045 552.

Describes microteaching/minicourse sequence; suggests school district approach to the program; outlines operational procedures; gives technical instructions for training teachers to use audio and video equipment; lists equipment needed and gives diagrams of possible studio arrangement.

BIBLIOGRAPHIES

Cooper, James M.; Allen, Dwight W. *Microteaching: An Annotated Bibliography*. Washington: ERIC Clearinghouse on Teacher Education, 1970.
ED 036 466.

Canadian Teachers' Federation. *Microteaching: Bibliographies in Education No. 5*. Ottawa: the Federation, 1969.
ED 036 480.

McKnight, Philip C.; Baral, David P. *Microteaching and the Technical Skills of Teaching: A Bibliography of Research and Development at Stanford University, 1963-1969*. Stanford, Calif.: Stanford University Center for Research and Development in Teaching, 1969.
ED 030 621.

DOCUMENTS

Acheson, Keith A. "The Effects of Feedback from Television Recording and Three Types of Supervisory Treatment on Selected Teacher Behavior." Stanford, Calif.: Stanford University, 1964.

Allen, Dwight. *Micro-teaching: A Description.* Stanford, Calif.: Stanford University, 1967.
ED 019 224.

Described is the use of microteaching in the Stanford teacher education program. Included are discussions of (1) background information on microteaching, (2) preliminary planning facilities, and personnel utilization, (3) the structure and format of the clinics, and (4) the evaluative data obtained during each year. Also discusses microteaching as a new approach for inservice teacher education, the technical skills of teaching, and developing specific skills through microteaching.

Allen, Dwight W.; and others. "A Comparison of Different Modeling Procedures in the Acquisition of a Teaching Skill." Paper presented at the meeting of American Educational Research Association (AERA). New York: 1967.

Allen, Dwight W. *Micro-teaching: A New Framework for In-Service Education.* Stanford, Calif.: Stanford University.
ED 013 240.

Microteaching was used in a series for the in-service training of supervisors. The training seminars demonstrated that microteaching can be of real value to experienced personnel. Microteaching was found to be valuable for inservice situations because of (1) its immediate feedback and reteaching factor, (2) the need to give team-teaching personnel total runs, (3) its ability to accurately gauge the instructional level of new material, (4) its use in providing an index of teaching ability prior to employment, and (5) its providing for a continuous supervision and evaluation of beginning teachers.

Allen, Dwight W.; Cooper, James M. *Microteaching. PREP-17.* Washington: ERIC Clearinghouse on Teacher Education, 1970.
ED 041 190.

This package of papers and bibliographies from PREP (Putting Research into Educational Practice) deals with research, rationale, uses, and equipment needed for microteaching. It is based upon a paper by Allen and Cooper, *Microteaching: History and Present Status.*

Allen, Dwight W.; Ryan, Kevin. *Microteaching.* Reading, Mass.: Addison-Wesley Publishing Co., 1969.
ED 030 647. Not available through ERIC.

This book describes the history of microteaching, the component-skills approach, elements and structures of microteaching, preservice and inservice applications, uses with Peace Corps and Teacher Corps, and research potential.

Babin, Patrick. *Student's Guide to Microteaching.* Ontario: University of Ottawa, Center for Cybernetic Studies, 1969.
ED 033 918.

A manual containing specific information on the Ottawa Microteaching Clinic as well as papers and bibliographies on microteaching, teaching skills taught, behavioral objectives. Also has evaluation sheets for each of 15 skills containing questions for students, supervisors, and teachers.

Berliner, David C. *Microteaching and Technical Skills Approach to Teacher Training.* Stanford, Calif.: Stanford Center for Research and Development in Teaching, 1969.
ED 034 707.

This paper reviews the history and current state of research and development of microteaching and technical skills training as related to the Stanford University program. Suggestions for future work are also included.

Claus, Karen D. "Effects of Cueing During Modeling and Feedback Sessions on Learning a Teaching Skill." Paper presented at the Annual Meeting of the American Psychological Association. San Francisco, Calif.: 1968.

Cooper, James M.; Allen, Dwight W. *Microteaching; History and Present Status.* Washington, D.C.: ERIC Clearinghouse on Teacher Education, 1970.
ED 036 471.

A state-of-the-art paper summarizing the history of microteaching's development, its rationale, the uses of microteaching, and research evidence on microteaching. The emphasis of the research summary is on impirically based studies of behavioral change.

Davis, O. L., Jr.; Smoot, B. R. *Effects on the Verbal Teaching Behaviors of Beginning Secondary Teacher Candidates' Participation in a Program of Laboratory Teaching.* Austin: University of Texas, 1969.

Using a modified version of microteaching- i.e., pupils were peers, but were not role-playing- trainees received training in a program of laboratory teaching. The experiment was successful in changing trainees' verbal behavior from convergent questions to divergent and probing. The trainees informed less, clarified more, and uttered fewer procedural-nonsubstantive units than before training.

Ellery, J. B. "A Pilot Study of the Nature of Aesthetic Experiences Associated with Television and Its Place in Education". Unpublished manuscript. Detroit: Wayne State University, 1959.

Gladstone, A. "The Readability of the Commentary." *Learning from Films* edited by M. A. May and A. A. Lumisdaine. New Haven: Yale University Press, 1958. pp. 46-57.

Hoehn, Lidburn P. ed. *Teaching Behavior Improvement Program.* Detroit: Ohio Regional Educational Laboratory, July, 1969. ED 034 719.

This document is intended to be used by those wishing to implement an inservice teacher self-improvement program. The document includes a history of two years of field testing in real school situations, factors of concern to a leader, and lists of materials and manuals.

Kallenbach, Warren. *The Effectiveness of Videotaped Practice Teaching Sessions in the Preparation of Elementary Intern Teachers. Final Report.* San Jose, Calif.: San Jose State College, 1967. ED 021 776.

A study made to extend previous research findings on the effectiveness of microteaching techniques. Results indicated that a microteaching program, while saving time for staff and interns, can be just as effective as a regular student teaching program. Includes a 29-item bibliography.

--- "Microteaching as a Teaching Methodology". Paper presented at a conference on "Instructional Methods and Teacher Behavior," Berkeley, Calif.: 1966. ED 013 791.

Various research on microteaching briefly reviewed. No significant differences in judged teacher competence were found between randomly selected intern teachers with summer student teaching experience and those with microteaching at Stanford. Another study tested effects of self-feedback and reinforcement on the acquisition of a teaching skill and found that self-feedback was relatively ineffective as compared with the pointing out of cues and positive supervisor reinforcement. A final study demonstrated that showing a student what to do was more effective than telling him.

Kallenback, W. W.; Gall, M. D. "The Comparative Effects of Microteaching and a Conventional Training Program on the Classroom Performance of Elementary Intern Teachers." Unpublished Manuscript. Berkeley, Calif.: Far West Laboratory for Educational Research and Development, 1968.

This study compares the effectiveness of elementary school interns trained in a summer microteaching program with interns who received conventional training. It was concluded that microteaching is an effective training strategy since it achieved similar results when compared with conventional methods, but in only one-fifth the time and with fewer administrative problems.

Lumisdaine, Arthur A. "Pictorial Quality and Color." *Learning from Films* edited by M. A. May and A. A. Lumisdaine. New Haven: Yale University Press, 1958. pp. 18-20.

Lumisdaine, Arthur A.; Gladstone, A. I. "Overt Practice and Audio-Visual Embellishments." *Learning from Films* edited by M. A. May and A. A. Lumisdaine. New Haven: Yale University Press, 1958. pp. 58-71.

McDonald, F. J.; Allen, D. W. *Training Effects of Feedback and Modeling Procedures on Teacher Performance.* Stanford, Calif.: Stanford University, 1967. ED 017 985.

This report describes a series of three experiments to assess the use of television recordings to improve teaching performance. In particular the experiments investigate the effects of (1) self-feedback and reinforcement on the acquisition of a teaching skill, (2) feedback and practice conditions on the acquisition of a teaching strategy, and (3) modeling and feedback variables on the acquisition of a complex teaching strategy.

Northrop, D. S. "Effects on Learning of the Prominence of Organizational Outlines in the Instructional Film." *Instructional Films Research Reports*. Port Washington, N.Y.: U.S. Naval Special Devices Center, 1952.

Orme, Michael E. "The Effects of Modeling and Feedback Variables on the Acquisition of a Complex Teaching Strategy." Unpublished doctoral dissertation. Stanford, Calif.: Stanford University, 1966.
ED 014 441.

The relative effectiveness of six modes of training teachers to use probing questions was investigated. The modes involved symbolic modeling, perceptual modeling, or both coupled with feedback. Perceptural modeling appeared superior to symbolic.

Pinney, Robert H.; Miltz, Robert J. *Television Recordings and Teacher Education - New Directions*. Stanford, Calif.: Stanford Center for Research and Development, 1968.
ED 019 847.

A study of supervisory techniques reveals that use of videotape recordings can increase the supervisor's ability to change subsequent recorded teacher behavior. A study on teacher selection shows that a five minute videotaped lesson can be as reliable a predictor of subsequent teaching performance as the normal length interview procedure.

Perlberg, Ayre; and others. *The Use of Portable Video Tape Recorders and Microteaching Techniques to Improve Instruction in Vocational-Technical Programs in Illinois*. Urbana: University of Illinois, Department of Vocational and Technical Education, 1968.
ED 028 253.

This report describes a study conducted at the University of Illinois, Urbana, utilizing videotape recorders and microteaching for the improvement of college instructors. The techniques employed resulted in favorable attitudinal responses by the participants.

ARTICLES

Allen, Dwight W.; Clark, R. J. "Microteaching: Its Rationale." *High School Journal* 51:75-79. November, 1967.

This article gives a rationale for microteaching and a brief history of its development at Stanford University. Also discussed are other uses of microteaching, including assessing new materials and techniques and its use in research.

Bush, Robert N. "Microteaching: Controlled Practice in the Training of Teachers." *Communication* 48:201-207. July, 1966.

This article reports a comparison between standard observation and teacher aide experiences and the microteaching experiences for two different groups of intern teachers enrolled in the Stanford University Secondary Education Program. Findings of the clinical experimentation showed that the candidates who received microteaching training performed at a higher level of teaching competence than a similar, traditionally taught group. It was also found that performance in the microteaching situation accurately predicted subsequent classroom performance.

Dugas, Donald G. "Micro-teaching- A Promising Medium for Teacher Training." *The Modern Language Journal* 51:161-166. March, 1967. ED 013 560.

Conclusions of this study were that (1) microteaching is an effective device in retraining experienced teachers, (2) it is difficult to determine how adaptable microteaching is to advanced level courses where the subject matter is only vaguely defined, and (3) videotape is an excellent means of studying a participant's grammar and phonology.

Johnson, Rita B. "The Effects of Prompting. Practice and Feedback in Programmed Videotape." *American Educational Research Journal* 5:73-79. 1968.
ED 026 342. Not available through ERIC.

Report of an experiment designed to test the hypothesis that a program of prompting, practice, and feedback would improve the beginning teacher's ability to observe pupil performance in the classroom. Group viewing instructional videotape while following a programmed booklet made most significant improvement.

Kanner, J. H.; Rosenstein, A. J. "Television in Army Training: Color versus Black and White." *AV Comminication Review* 8:243-252. 1960.

Meier, John H. "Rationale for and Application of Microtraining to Improve Teaching." *Journal of Teacher Education.* Summer 1968, pp. 145-57.

This article relates several common learning theories to the microteaching process of subjecting samples of human behavior to videotape recording, reviewing, responding, refining, and redoing (five r's). A number of applications of microteaching are cited in the article, including inservice application conducted by the Jefferson County School District in Colorado and studies connected by the Child Study Institute at Colorado State College.

Tuckman, B. W.; Oliver, W. J. "Effectiveness of Feedback to Teachers as a Function of Source." *Journal of Educational Psychology.* August 1968, pp. 297-301.

FILMS

Allen, Dwight W. "Logistics for a Microteaching Clinic." Amherst: University of Massachusetts, School of Education, Innovation Film Library.

--- "Microteaching." Amherst: University of Massachusetts, School of Education, Innovation Film Library.

--- "Training Decisions in a Microteaching Clinic." Amherst: University of Massachusetts, School of Education, Innovation Library.

INTERACTION ANALYSIS AS A TOOL FOR TEACHER TRAINING

An Annotated Bibliography

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References are taken from *Research in Education* 1970-June, 1971

ERIC Descriptors Searched:
Interaction Process Analysis
Classroom Observation Techniques

November, 1971

INTERACTION ANALYSIS AS A TOOL FOR TEACHER TRAINING

Interaction analysis systems exist in order to give an observer of (or participant in) a given situation of human interaction an objective record of what kinds of behavior occurred in what order. From this record inferences may be drawn concerning influence of one person's behavior on that of others and frequency of any specific behavior by any specific person. Obviously, this type of analysis is at work in the minicourse design. Interaction analysis studies were responsible for the identification of the effect upon pupils of various teacher behaviors; the studies thus showed that a need existed for the skills taught in each minicourse. In addition, interaction analysis techniques play an important part in the minicourse model. When the trainee watches the videotape of his microteaching session, he uses interaction analysis to evaluate his teaching behavior. The brief bibliography that follows lists references on interaction analysis that are primarily concerned with teacher behavior.

Amidon, Edmund. "Interaction Analysis And Microteaching Skill Development in Teaching." Paper presented at American Psychological Association Annual meeting, 1969, Washington, D.C.
ED 036 469.

Uses microteaching and Flander's interaction analysis as a feedback tool for teachers.

Belland, John C.; and others. "Analyzing Teacher Questions: A Comparative Evaluation of Two Observation Systems." Paper presented at American Educational Research Association annual meeting, 1971, New York.
ED 050 031.

General systems for analyzing instructional interaction have found the most common teacher behavior to be asking questions. This evaluation compares and contrasts two systems for analyzing teacher questions: Price-Belland, developed by the authors from Bloom-Sanders tradition, and Hough-Duncan, modified for detailed question analysis.

Brunner, Ellen. "PIC. Profile of Interaction in the Classroom. A Quick Feedback of Interaction Analysis." Paper presented at AERA annual meeting, 1970, Minneapolis.
ED 040 144.

PIC is a short-cut method of interaction analysis that can provide quick feedback needed for effective supervision of instruction.

Flanders, N. A. "Intent, Action and Feedback: A Preparation for Teachers." *Journal of Teacher Education*, 14:25; September 1963.

--- "Interaction Analysis and In-Service Training," *California Journal for Instructional Improvement*, 9:14-31; March 1966.

Explains widely used Flanders' interaction analysis system and how it can be used in inservice education of teachers.

Gibson, Dennis L. "The HIM-G as a Rapid Method for Verbal Interaction Analysis in a Small Group." Paper presented at American Personnel and Guidance Association convention, 1970, New Orleans.
ED 041 941.

Shorter method for analysis of verbal interaction in small groups. Minimal rater training needed for its use.

Langer, Philip; Allen, G. Edward. "The Minicourse as a Tool for Training Teachers in Interaction Analysis." Paper presented at American Educational Research Association annual meeting, 1970, Minneapolis.
ED 037 393.

Description of Minicourse 4 which trains teacher in use of Flander's interaction analysis to categorize own classroom behavior.

Luft, Max; Bemis, Katherine A. *Video Tape Techniques for Establishing Inter-Rater Reliability*. Albuquerque: Southwestern Cooperative Educational Laboratory, 1970.
ED 040 952.

Object of study to validate a technique for establishing interrater reliability on the Southwestern Cooperative Interaction Observation Schedule.(SCIOS).

Morse, Kevin R.; Davis, O. L. Jr. *The Questioning Strategies Observation System*. Austin: University of Texas. Research and Development Center for Teacher Education, 1970.
ED 046 907.

System is designed to record verbal behaviors occurring in the classroom which are associated with the teacher's use of questions.

Ober, Richard L.; and others. "Simultaneous Use of Four Different Observational Systems to Assess Student Teacher Classroom Behavior." Paper presented at AERA annual meeting, 1970, Minneapolis.
ED 041 830.

Findings of study are discussed; instruments used are included.

Reynolds, William W. Jr.; and others. "The Classroom Observational Record." Paper presented at AERA annual meeting, 1971, New York.
ED 048 378.

Describes an instrument designed to yield quick and reliable data on cognitive processes in classroom interactions.

Sandefur, J. T.; Bressler, Alex A. *Classroom Observation Systems in Preparing School Personnel: An Annotated Bibliography.* Washington: ERIC Clearinghouse on Teacher Education, 1970.
ED 036 483.

Lists and annotates 39 books, articles, reports, and manuals. 1943-1969.

Simon, Anita, Ed.; Boyer, E. Gil, Ed. *Mirrors for Behavior, An Anthology of Classroom Observation Instruments.* Philadelphia, Research for Better Schools, 1969.
ED 031 613. Not available through ERIC.

A 12-volume anthology (over 3300 pages) covering 79 classroom observation systems designed to collect data about human interaction. These materials give theoretical rationales and descriptions of the instruments. When available, research study findings, user's manuals, and other supplementary materials are included.

--- *Mirrors for Behavior, An Anthology of Classroom Observation Instruments. 1970 Supplement, Vols. A and B.* Philadelphia: Research for Better Schools, 1970.
ED 042 937. Not available through ERIC.

Adds 13 observation systems to the 79 in the original publication.

---. "Mirrors for Behavior: An Anthology of Classroom Observation Instruments" (entire issue), *Classroom Interaction Newsletter*, 3:1-233; January 1967.
ED 029 833. Not available through ERIC.

An earlier, shorter version of the 12-volume publication. Twenty-six cognitive and affective classroom observation instruments are abstracted in this anthology; data collection methods, purposes and implications, observer reliability procedures, and categories used in coding behavior are described for each one. A 369-item bibliography is included.

Webb, Jeaninne Nelson; Brown, Bob Burton. "Establishing Reliability and Validity Estimates for Systematic Classroom Observation." Paper presented at American Educational Research Association annual meeting, 1969, Los Angeles.

Conclusions of this study were that if observers share a common perceptual framework between-observer agreement can be achieved easily with little or no training, but within-observer reliability is difficult to achieve. Training should focus on establishing the reliability of the individual observer.

Whitley, A. Dan. *A Behaviorist's Interaction Analysis: The Classroom Observation Schedule*. Springfield, Illinois: Office of the Superintendent of Public Instruction, Department of Pupil Personnel Services, 1969.
ED 036 847.

Report describing techniques used by a behaviorist when he consults with a teacher using a classroom observation schedule. Author suggests that objective of counseling services should be to change human behavior, not analyze it.

MINICOURSE I: EFFECTIVE QUESTIONING--ELEMENTARY LEVEL

A TIS Summary Paper

Minicourse I was the first minicourse to emerge from the Far West Laboratory's development cycle as a completed product. The teaching skills that it treats (using microteaching) all deal with *classroom questioning*. The goal of Minicourse I is to improve the quality of class discussions by training the teacher in effective questioning techniques. (For background information see TIS papers, "Microteaching" and "Overview of the Minicourse Model.")

IMPORTANCE OF QUESTIONING SKILLS

One reason that effective questioning is an important teaching technique is that it involves such a great portion of teacher time. In recently conducted interaction analysis studies, Smith (1960) found that the most frequent type of classroom interaction sequence is that of teacher question followed by student answer. Aschner (1961) describes questioning as "one of the basic ways by which the teacher stimulates student thinking and learning." Klebaner (1964) notes that each question used in class discussion serves two purposes: the one for which it is asked, and the long range goal of developing the child's ability for independent inquiry.

Centrality to Inquiry and Process Approach Programs

Effective questioning is central to the successful use of inquiry and process approach programs. The teacher in such programs is no longer the traditional "giver of knowledge" but a stimulator and director of pupil inquiry and thought. To effectively stimulate and motivate pupils in such a situation, the teacher must be aware of the type of question he is asking and its probable effect upon the pupil. Schippers (1962) noticed that teachers who felt uneasy with and afraid of the process approach found the question raising portion of the approach to be their greatest dilemma. The questioning techniques that Minicourse I treats are applicable to inquiry and process approach programs.

Influence on Level of Pupil Answer

The relationship of type of question to quality of pupil answer has been well established by research. A study by Taba, Levine, and Elzey (1964) demonstrated a nearly perfect correlation between level of children's verbally expressed

thoughts and the level of questions asked by the teacher. This same study showed that the focus set by a teacher's questions is crucial to the mental operations of the pupil and to the modes of thought he develops. Gallagher and Aschner (1965) found that the level of question asked by the teacher evokes the same level of response from the children. For example, if the teacher asks, "Who discovered America?" the pupil will use only his powers of recall to supply the answer, "Columbus." Since the question does not call for higher level thinking such as analysis or evaluation, the pupil does not use these higher cognitive processes. Teacher questioning has much to do with the cognitive development of pupils.

Common Questioning Practices

Studies of teacher questioning practices indicate a definite need for instruction in Minicourse I skills. Research gathered during the development of Minicourse I (Borg, *et al.*, 1970) indicated that teacher talk accounted for approximately two-thirds of class discussion periods and that 60 percent of their questions asked for factual recall while only 20 percent asked for higher level thought. (The other 20 percent were questions regarding classroom or assignment procedures.) These practices, of course, severely limit the number of opportunities for pupils to develop verbal skills or higher thought processes. Other studies support these findings: Guszok (1968) found that elementary school reading teachers asked 56.9 percent factual recall questions, while Hunter's study (1969) found 95 percent of all questions asked to be answerable by recall of facts.

Research studies also indicate that teachers who receive instruction on cognitive levels of questions and the relationship between the questioning level and pupil's response level ask significantly more questions at higher cognitive levels than do teachers who have not had such training (Clegg, *et al.*, 1967; Farley and Clegg, 1969). Gagnon (1965) found focused instruction necessary for the teacher to learn how to ask higher order cognitive questions. Minicourse I provides such instruction.

COGNITIVE LEVEL OF QUESTIONS

A number of systems have been developed which define cognitive processes and place them in order of complexity. The most widely used of these is the system outlined by Benjamin S. Bloom, in his *Taxonomy of Educational Objectives: Handbook I: Cognitive Domain*. Question categories are listed in ascending order to the cognitive level of the answer required:

Category	Definition
1. Knowledge	Any question, regardless of complexity, that can be answered through simple recall of previously learned material.
2. Comprehension	Questions that can be answered by merely restating or reorganizing material in a rather literal manner to show that the student understands the essential meaning.
3. Application	Questions that involve problem solving in new situations with minimal identification or prompting of the appropriate rules, principles, or concepts.
4. Analysis	Questions that require the student to break an idea into its component parts for logical analysis: assumptions, facts, opinions, logical conclusions, etc.
5. Synthesis	Questions that require the student to combine his ideas into a statement, plan, product, etc., that is new for him.
6. Evaluation	Questions that require the student to make a judgment about something using some criteria or standard for making his judgment.

(Definitions are from Clegg, *et al.*, 1969).

SKILLS TAUGHT IN MINICOURSE I

Twelve classroom questioning skills are taught in Minicourse I. The course divides these into four instructional sequences:

Instructional Sequence I: *Teacher Skills That Encourage Pupil Response*

(1) *Pausing after question is asked.* The purpose of this practice is to allow the child time to frame a better answer. If higher order responses are expected, the pupil must be allowed time to complete more elaborate thought processes.

(2) *Dealing with incorrect answers in an accepting manner.* A student whose incorrect answers are ridiculed or reproached is not likely to continue to take part in discussions. When he no longer answers verbally, he may soon cease to go through the processes necessary to frame mental answers.

(3) *Calling on volunteers and non-volunteers.* If only volunteers are called upon, a non-volunteering child may continually fail to engage in the thought processes required by the question. He misses a mental exercise which has a direct relationship to his cognitive development.

Instructional Sequence 2: *Increasing Quantity and Quality of Pupil Participation*

(4) *Redirection* is the process by which the teacher composes questions that can be answered by more than one pupil. The standard interaction of teacher question/pupil answer can thus be changed to teacher question/pupil answer/pupil answer/pupil answer. This practice increases the number of opportunities for pupil participation and reduces the amount of teacher talk.

(5) *Framing questions that call for longer responses.* Since one of the long range goals of class discussions is the development of pupil communication skills, any technique that reduces teacher talk and increases pupil participation is advantageous. Also, Corey and Fahey (1940) found the number of words per pupil reply to be directly related to the cognitive level of the reply.

(6) *Framing questions that require students to use higher order cognitive processes.* Research shows (see section on "Influence on Level of Pupil Answer") that such questions do, in fact, develop pupils' abilities to use higher cognitive processes.

Instructional Sequence 3: *Probing Techniques to Develop an Initial Pupil Response*

(7) *Prompting.* The teacher prompts a pupil when he has given an "I don't know" or a very weak answer. This may be accomplished through leading questions or other hints that will help the pupil improve upon his initial response. In this way the teacher helps him develop his own answer to the question, helps him go through the appropriate cognitive process. The pupil is not told the answer.

(8) *Seeking further clarification.* The teacher seeks clarification when the initial response is basically correct but is incomplete or unclear. This technique differs from prompting in that the teacher asks for improvement on the initial answer and does not supply any additional information. The pupil is required to complete the cognitive process involved and express it clearly.

(9) *Refocusing* occurs when the pupil is asked to relate his initial (completely acceptable) answer to a topic which he has previously studied. Teachers most often use this technique to ask a student to engage in the higher cognitive process of synthesis.

Instructional Sequence 4: *Teacher Practices That Decrease Questioning Efficiency.* This sequence involves three practices that have a negative effect upon classroom discussions. These practices work against the goals of building pupil communication skills and cognitive processes. They all increase teacher talk.

(10) *Repeating own questions.*

(11) *Answering own questions.* This practice encourages the pupil to dismiss as "too difficult" any question he cannot answer immediately. When the teacher answers the question, he reinforces the pupil's conclusion.

(12) *Repeating pupil answers* is an especially dangerous practice. It hinders communication among pupils and encourages the child to be satisfied with giving unclear or incomplete answers since the teacher will usually restate or amend his answer in repeating it.

EFFECTIVENESS OF MINICOURSE I

Table I comparing Minicourse I pre- and postcourse tapes shows results of the main field test which involved 48 teachers in 12 school districts. Ten of the eleven changes brought about by the Minicourse appear to be large enough to be of practical as well as statistical significance. The final entry in the table, though not one of the twelve specific skills taught, is related to several of these skills and was a course objective--to reduce the proportion of time taken by teacher talk. The reduction of teacher talk to about half the precourse level appears to be a major accomplishment.

PERMANENCE OF MINICOURSE I SKILLS

Borg (1970) reports that the developers of Minicourse I designed a short refresher course to reduce anticipated retention losses of Minicourse I skills. This refresher course, following the same format as the full minicourse and taking four hours of teacher time, was used two months after the minicourse with one-third of the group of 38 teachers still available from the main field test. A second third of the group had a four-hour refresher course following a different format. The final third (a control group) viewed four hours of films unrelated to the minicourse. Two months after these three treatments, the 38 teachers were videotaped under the same conditions that existed for pre- and immediate postcourse tapes. The group receiving the refresher course did not do consistently better than the other two-thirds of the sample.

The refresher course had apparently failed. However, when immediate postcourse and these delayed postcourse tapes were compared, it was found that there had been virtually no loss in most Minicourse I skills. The refresher course failed because the teachers were in no need of it when it was given. Minicourse I brings about long-term improvement in the use of effective questioning techniques.

TABLE I

THE MAIN FIELD TEST

Results from Analysis of Minicourse 1 Pre-and Postcourse Tapes

BEHAVIOR	MEAN SCORES PRE-COURSE	POST-COURSE	t[2]
1. Number of times teacher used redirection.	26.89	40.92	4.98*
2. Number of times teacher used prompting.	4.10	7.17	3.28*
3. Number of times teacher used further clarification.	4.17	6.73	3.01†
4. Number of times teacher used refocusing.	.10	.02	.00
5. Number of times teacher repeated his own questions.	13.68	4.68	7.26*
6. Number of times teacher repeated pupil answers.	30.68	4.36	11.47*
7. Number of times teacher answered his own questions.	4.62	.72	6.88*
8. Length of pupil responses in words (based on five-minute samples of pre- and posttapes).	5.63	11.78	5.91*
9. Number of one-word pupil responses (based on five-minute samples of pre- and posttapes).	5.82	2.57	3.61**[3]
10. Length of teacher's pause after question (based on five-minute samples of pre- and posttapes).	1.93	2.32	1.90*
11. Frequency of punitive teacher reactions to incorrect pupil answers.	.12	.10	.00
12. Percentage of total questions that called for higher cognitive pupil responses.	37.30	52.00	2.94†
13. Percentage of discussion time taken by teacher talk.	51.64	27.75	8.95*

[1]Eleven comparisons are based on forty-eight matched cases. One-tailed t-tests are used in this table and succeeding tables.

[2]This is a statistical test designed to determine whether two mean scores are significantly different.

[3]Means would have been approximately four times greater if entire tapes had been analyzed; t-test would have been higher.

[4]p indicates the probability that a difference in mean scores occurred by chance. For example, $p < .01$ indicates that there is only one chance in a hundred that the difference between pre- and postcourse scores would have occurred by chance.

*$p < .01$

†$p < .005$

**$p < .05$

(Walter R. Borg, and others, *The Minicourse: A Microteaching Approach to Teacher Education*, p. 76.)

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MINICOURSE 2: DEVELOPING CHILDREN'S ORAL LANGUAGE

A TIS Summary of

Beatrice A. Ward; and others. Minicourse 2: *Developing Children's Oral Language. Teacher's Handbook.* Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1971.

PURPOSE

Based upon the observation that language influences both what and how we learn, Minicourse 2 has been designed to aid primary teachers in acquiring some specific teaching behaviors that will promote the language development of children. "Young children whose previous experiences have not adequately promoted language development require carefully planned instruction to facilitate their future learning" (p. 1). The emphasis of Minicourse 2 is on aspects of language development that are especially critical to thinking and learning. These areas of language instruction seem to be extremely important for the child who has had minimal language experience.

IMPORTANCE OF ORAL LANGUAGE SKILLS

The language that a young child experiences marks out a conceptual pattern to which he adapts and around which he organizes and structures his perceptions. (He may have difficulty categorizing into one group trucks, railroad cars, wheelbarrows, and toboggans if he does not have the word, or concept, for "vehicle.")[1] If these patterns around which he organizes perceptions are incomplete or at variance with the dominant patterns of the culture, he may have serious learning difficulties. He may also lack opportunities for extensive verbal exchange with adults. To help a child overcome these difficulties, the primary teacher needs to exercise specific teaching skills.

TEACHING BEHAVIORS IN MINICOURSE 2

Four basic teaching behaviors that lead to language and thought development in children are taught in Minicourse 2. These four behaviors are (p. 4):

1. Expand the complexity, flexibility, and precision of language and thought.
2. Model new language patterns.
3. Elicit children's use of new language.
4. Provide specific praise for use of precise language.

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[1] B. Bernstein, "Social Class and Linguistic Development, A Theory of Social Learning," *Education, Economics, and Society.* A. H. Halsey (Ed.), New York: The Free Press of Glencoe, 1961.

In the process of Minicourse 2 all four basic behaviors will be applied to teaching specific language skills to children. In addition, four basic principles of learning (pp. 4-6) should be applied throughout the minicourse.

1. Children will learn new language best if they feel the need for the language.
2. Children will learn new language best when it is associated with something they already know or with something they can see and feel.
3. Children will learn new language best when it is heard and used often.
4. Language and thought are interdependent and therefore should be developed together.

COURSE SEQUENCE OF MINICOURSE 2

Specific skills that will help the teacher apply the teaching behaviors and principles of learning mentioned above are organized into five learning sequences.

Instructional Sequence 1: *Teaching Behaviors for Expanding Language and Thought*

1. Extend language by placing the child's words in a complete sentence.
2. Refine language by using more precise words or grammatical forms.

Instructional Sequence 2: *Teaching Behaviors for Establishing Language Patterns*

1. Model new language patterns.
2. Elicit children's use of new language.
3. Provide specific praise for use of precise language.

Instructional Sequence 3: *Teaching the Use of Language to Describe Position*

1. Model positional language in context and with objects.
2. Provide varied physical experiences.
3. Elicit children's use of positional language.

Instructional Sequence 4: *Teaching the Use of Language to Describe and Classify Objects*

1. Elicit observations of objects.
2. Elicit observations of similarities and differences between and among groups of objects.
3. Model language structures describing comparisons.

Instructional Sequence 5: *Teaching the Use of Language to Describe and Identify Action*

1. Verbalize (or model) action words in conjunction with a demonstration of the action.
2. Introduce other actions that are described by a particular word.
3. Elicit children's use of action words.

EFFECTIVENESS

Minicourse 2 has undergone extensive testing. The findings of the main field test (which involved 47 kindergarten teachers) indicate that before taking the course, the teachers used only one skill--eliciting the use of language by pupils. After taking the course, teachers made significant gains in all the major skills. The most significant gains were made in the expansion and modeling of language for children, two skills linguists consider crucial to pupil language development. A second study involving 49 teachers also investigated changes in pupil language use. Daily language lessons for pupils based on Minicourse 2 teaching skills produced significant changes in the complexity of the pupils' language. Finally, over 90 percent of the teachers who have taken Minicourse 2 rate it superior to any other training they have received (pp. xiv-xv).

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MINICOURSE 5: INDIVIDUALIZING INSTRUCTION IN MATHEMATICS

A TIS Summary of

Meredith D. Gall; and others. *Minicourse 5: Individualizing Instruction in Mathematics. Teacher's Handbook.* Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1971.

PURPOSE AND OVERVIEW

The goal of Minicourse 5 is to increase the skill of elementary school teachers in the individual tutoring of pupils deficient in their understanding of mathematical concepts and procedures. Mathematics education literature has revealed techniques that contribute to effective tutoring: diagnosis, demonstration, evaluation, and practice. Minicourse 5 is designed to teach the skills involved in this "Basic Tutoring Sequence." Diagnostic and demonstration techniques are given for tutoring pupils in both number operations and verbal reasoning problems. Minicourse 5 also addresses the effective use of diagnostic questions, expanded notation, number lines, manipulatives, number sentences, and diagrams in the tutoring process. In addition, techniques for encouraging active pupil participation in the tutoring session are taught.

Videotape may be used for recording Minicourse 5 microteaching sessions, but it is not required; audiotape may be used equally well.

IMPORTANCE OF TUTORING IN MATHEMATICS

Since there are individual differences among pupils, not all will profit from an abstract explanation of mathematical concepts. Some will require more concrete approaches such as the use of manipulative materials; some pupils will need help with practice exercises. In order to successfully individualize mathematics instruction, therefore, the teacher will need to be skilled in a variety of tutoring techniques.

Does individualized tutoring help pupils learn mathematics? Apparently it does. The review of research on mathematics tutoring conducted during the development of Minicourse 5 demonstrated that individualizing instruction through tutoring is an effective way of raising a pupil's level of achievement in mathematics (pp. 19-23).

SKILLS TAUGHT IN MINICOURSE 5

Instructional Sequence 1: *Rewarding Correct Responses and Encouraging Active Participation in Tutoring*

1. Using general verbal praise
2. Using specific verbal praise
3. Asking prompting questions

Instructional Sequence 2: *Diagnosis in the Basic Tutoring Sequence*

1. Asking general diagnostic questions
2. Asking diagnostic questions dealing with number operations
3. Asking diagnostic questions dealing with verbal problems

Instructional Sequence 3: *Demonstration Techniques in the Basic Tutoring Sequence (Developing pupil understanding of mathematics concepts and processes)*

1. Having pupils estimate an answer before computing
2. Using demonstration techniques for number operations
   a. Using expanded notation
   b. Using a number line
   c. Using manipulatives
3. Using demonstration techniques for verbal problems
   a. Drawing pictures or diagrams
   b. Writing a number sentence

Instructional Sequence 4: *Evaluation and Practice in the Basic Tutoring Sequence*

1. Assigning evaluation problems to be worked without assistance
2. Assigning practice problems

Instructional Sequence 5: *Organizing Mathematics Instruction for Increased Tutoring Time*

1. Having pupils come to the teacher's desk for tutoring
2. Arranging for pupil correction of exercises
3. Using peer tutoring

EFFECTIVENESS

Research by the Far West Laboratory for Educational Research and Development, the minicourse developer, indicates that the minicourse technique brings about greater changes in specific teaching skills than does any other approach that has been reported. In addition, evidence to date indicates that improvements brought about by the minicourse become a permanent part of teaching practice (p. 14). A detailed report of research on five minicourses is available in Walter R. Borg, and others, *The Minicourse: A Microteaching Approach to Teacher Education* (Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1970).

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TUTORING AS A TECHNIQUE FOR INDIVIDUALIZING INSTRUCTION IN MATHEMATICS

An Annotated Bibliography

References are from *Research in Education*,
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MINICOURSE 8: ORGANIZING INDEPENDENT LEARNING, PRIMARY LEVEL

A TIS Summary of

Beatrice A. Ward; and others. *Minicourse 8: Organizing Independent Learning. Primary Level. Teacher's Handbook*, Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1971.

PURPOSE AND OVERVIEW

The main goal of Minicourse 8 is to train primary teachers to organize their classes for individualized instruction. A secondary goal is to develop independent learning skills in each child. (To help accomplish this goal, the reteach session in each instructional sequence is conducted with the full class rather than with the small microteaching group of 5-10 pupils.) The minicourse instructs teachers in the use of independent and small-group activities to individualize learning in their classrooms. Specifically, Minicourse 8 provides teachers with the skills needed to:

1. Introduce children to the idea of working independently.
2. Help children acquire skills for solving problems related to their work in independent activities.
3. Help children acquire expectations about independent activities and the role of the teacher in these activities.

When these goals have been accomplished, the teacher will have the time needed to work with pupils individually and in small groups (pp. 2-3).

INDEPENDENT LEARNING IN THE CLASSROOM

For the purposes of Minicourse 8, independent learning is defined as "the learning that occurs outside the ongoing direct supervision of the teacher" (p.3). Within the classroom three general types of independent learning occur:

1. The child works without the teacher on a teacher-selected and teacher-assigned task.
2. The child participates in activities of his choosing without direct teacher supervision.
3. The child acquires skills and knowledge on his own when involved in a teacher-directed group activity.

As children become skilled in working independently and understand pupil and teacher roles in independent learning, the teacher will be able to individualize instruction in two ways. First, he can plan activities to meet individual needs (based on his observations of pupils and analyses of their needs). Then, while most pupils are engaged in independent activities, he may use the small-group approach to address the special needs of a few children (p. 4).

COURSE SEQUENCE OF MINICOURSE 8

Instructional Sequence 1: *Three Teaching Skills that Establish the Concept of Working Alone*

1. Discuss working alone.
2. Elicit examples from pupils.
3. Explain the teacher role.

Instructional Sequence 2: *Problem-Solving in Independent Activities*

1. Help pupils to identify problems.
2. Teach pupils to seek alternate solutions.
3. Teach pupils to evaluate alternate solutions.
4. Set standards for what pupils are to do when finished.
5. Evaluate pupil success at solving problems.

Instructional Sequence 3: *Delayed Teacher Response*

1. Discuss with pupils the difference between immediate and delayed teacher response to pupil work.
2. Demonstrate delayed response.
3. Use verbal and nonverbal cues to help pupils adjust to delayed response.

Instructional Sequence 4: *Establishing an Independent Learning Environment (Six permanent teaching skills)*

1. Review working independently with pupils.
2. Present assigned learning task to pupils.
3. Elicit problems and solutions from pupils.
4. Set standards for what to do when finished.
5. Provide delayed teacher response.
6. Evaluate pupil progress at working independently.

EFFECTIVENESS

The findings of the main field test (involving 46 kindergarten teachers) indicate that before taking the course, teachers used only one of the eleven skills, and pupils had none of the skills needed for independent work. After taking the course, the teachers showed significant gains in all the skills, and the pupils acquired all the learner skills included in the course. Similar results were obtained from a second test involving teachers of kindergarten through third grade classes. In addition, over 95 percent of the teachers who have taken Minicourse 8 rate it superior to any other training they have received (pp. xiii - xiv).

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MINICOURSE 9: HIGHER COGNITIVE QUESTIONING

A TIS Summary Paper

PURPOSE

The purpose of Minicourse 9 is to increase teachers' use of types of questions that help develop pupils' ability to think. Using Bloom's *Taxonomy of Educational Objectives: Handbook I: Cognitive Domain*, six types of questions commonly used by teachers have been identified: knowledge, comprehension, application, analysis, synthesis, and evaluation (see SUMMARY CHART OF QUESTION TYPES below). All six types of questions are, of course, important to good teaching. Most of Minicourse 9 concerns analysis, synthesis, and evaluation (higher cognitive) questions because these questions require pupils to engage in more complex thinking. A second goal of Minicourse 9 is to improve teachers' skill in helping pupils give good answers to higher cognitive questions. The course provides techniques to increase pupil awareness of the purpose of higher cognitive questions, and also to help pupils improve initially weak answers.[1]

IMPORTANCE OF QUESTIONING SKILLS

One reason that effective questioning is an important teaching technique is that it involves such a great portion of teacher time. In interaction analysis studies, Smith (1960)[2] found that the most frequent type of classroom interaction sequence is that of teacher question followed by student answer. Aschner (1961) describes questioning as "one of the basic ways by which the teacher stimulates student thinking and learning." Klebaner (1964) notes that each question used in class discussion serves two purposes: the one for which it is asked, and the long range goal of developing the child's ability for independent inquiry.

Centrality to Inquiry and Process Approach Programs

Effective questioning is central to the successful use of inquiry and process approach programs. The teacher in such programs is no longer the traditional "giver of knowledge" but a stimulator and director of pupil inquiry and thought. To

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[1] Meredith D. Gall; and others. *Minicourse 9: Higher Cognitive Questioning. Teacher's Handbook.* Beverly Hills, Calif.: Macmillan Educational Services, Inc., 1971. pp. 1-2.

[2] Full references for citations in this paper may be found in the TIS bibliography, "Questioning Techniques: An Annotated Bibliography." (Located with Minicourse 1 materials.)

effectively stimulate and motivate pupils in such a situation, the teacher must be aware of the type of question he is asking and its probable effect upon the pupil. Schippers (1962) noticed that teachers who felt uneasy with and afraid of the process approach found the question raising portion of the approach to be their greatest dilemma. The questioning techniques that Minicourse 9 treats are applicable to inquiry and process approach programs.

Influence on Level of Pupil Answer

The relationship of type of question to quality of pupil answer has been well established by research. A study by Taba, Levine, and Elzey (1964) demonstrated a nearly perfect correlation between level of children's verbally expressed thoughts and the level of questions asked by the teacher. This same study showed that the focus set by a teacher's questions is crucial to the mental operations of the pupil and to the modes of thought he develops. Gallagher and Aschner (1965) found that the level of question asked by the teacher evokes the same level of response from the children. For example, if the teacher asks, "Who discovered America?" the pupil will use only his powers of recall to supply the answer, "Columbus." Since the question does not call for higher level thinking such as analysis or evaluation, the pupil does not use these higher cognitive processes. Teacher questioning has much to do with the cognitive development of pupils.

Common Questioning Practices

Studies of teacher questioning practices indicate a definite need for instruction in Minicourse 9 skills. Research gathered during the development of Minicourse 1 (Borg, *et al.*, 1970) indicated that teacher talk accounted for approximately two-thirds of class discussion periods and that 60 percent of their questions asked for factual recall while only 20 percent asked for higher level thought. (The other 20 percent were questions regarding classroom or assignment procedures.) These practices, of course, severely limit the number of opportunities for pupils to develop verbal skills or higher thought processes. Other studies support these findings: Guszok (1968) found that elementary school reading teachers asked 56.9 percent factual recall questions, while Hunter's study (1969) found 95 percent of all questions asked to be answerable by recall of facts.

Research studies also indicate that teachers who receive instruction on cognitive levels of questions and the relationship between the questioning level and pupil's response level ask significantly more questions at higher cognitive levels than do teachers who have not had such training (Clegg, *et al.*, 1967; Farley and Clegg, 1969). Gagnon (1965) found focused instruction

SUMMARY CHART OF QUESTION TYPES [3]

Question Type	Student Activity	Examples
Knowledge	Recalling facts or observations. Recalling definitions.	1. *Who?* 2. *What?* 3. *Where?* 4. *When?* 5. *Why?* (if cause is given.) 6. *Define* (the word *gubernatorial*).
Comprehension	Giving descriptions. Stating main ideas. Comparing.	1. *Describe* (what happened in our experiment). 2. *What is the main idea* (of this paragraph)? 3. *How are* (these two countries) *alike?* *How are they different?*
Application	Applying techniques and rules to solve problems that have a single correct answer.	1. *If* (Bill has 49 cents), *how many* (8-cent balloons) *can he buy?* 2. *What is* (the latitude of Moscow)? 3. *Classify* (these poems as ballads, sonnets, or odes).
Analysis	Identifying motives or causes. Making inferences. Finding evidence to support generalizations.	1. *Why* (did the Bat-Poet write poems)? 2. *Now that we've studied this, what can we conclude about* (life in Germany)? 3. *What does this tell us about* (the author's attitude toward war?) 4. *What evidence can you find to support* (the principle that air expands when heated)?
Synthesis	Solving problems. Making predictions. Producing original communications.	1. *Can you think up* (a title for this drawing)? 2. *How can we solve* (this dilemma)? 3. *How can we improve* (our experiment)? 4. *What will happen* (now that we've landed on the moon)? 5. *What do you predict would happen* (if this lake were to run dry)?
Evaluation	Giving opinions about issues. Judging the validity of ideas. Judging the merit of problem-solution. Judging the quality of art and other products.	1. *Do you agree* (with Kathy)? 2. *Do you believe* (that this is the best way to proceed)? 3. *Do you think* (that it is right to execute convicted murderers)? 4. *What is your opinion* (on this matter)? 5. *Would it be better* (to do it this way)? 6. *Which* (painting) *do you like?*

[3] Gall, and others, p. 261. (Chart reprinted with permission of Macmillan Educational Services, Inc.)

necessary for the teacher to learn how to ask higher order cognitive questions. Minicourse 9 provides such instruction.

SKILLS TAUGHT IN MINICOURSE 9

Minicourse 9 skills are divided as follows into five lessons or instructional sequences. (For a description of minicourse activities, i.e., microteaching, see MINICOURSE INSTRUCTIONAL SEQUENCE, pages 2-3 of "An Overview of the Minicourse Model," a paper prepared by TIS).

Preliminary Lesson: *Writing and Classifying Knowledge, Comprehension, and Application Questions*

1. Knowledge Questions

   a. Recalling facts or observations
   b. Recalling definitions

2. Comprehension Questions

   a. Giving a description in one's own words
   b. Stating the main idea in one's own words
   c. Comparing

3. Application Questions--Solving a problem using acquired knowledge

Lesson 1: *Improving the Quality of Student Answers*

1. Establishing performance criteria for good answers

2. Asking probing questions to help students meet these criteria

Lesson 2: *Using Analysis Questions of Three Types*

1. Questions that require the student to explain relationships by identifying motives or causes ("why" questions)

2. Questions that require the student to make inferences, interpretations, or generalizations based on specific data (induction)

3. Questions that require students to find data to support an inference, interpretation, or generalization (deduction)

Lesson 3: *Using Synthesis Questions of Three Types*

1. Questions that ask students to make predictions

2. Questions that require students to solve problems

3. Assignments that require students to produce original communications such as plays, letters, titles, poetry, drawings, cartoons, and posters

Lesson 4: *Using Evaluation Questions of Four Types*

1. Questions that require students to give their opinions about issues

2. Questions that require students to judge the validity of ideas

3. Questions that require students to evaluate the merits of solutions to a problem

4. Questions that require students to judge the quality of art and other products

EFFECTIVENESS

As part of the development of Minicourse 9, an evaluation study involving elementary and junior high school teachers was conducted. The main findings were that, after taking the minicourse, teachers asked a significantly greater percentage of higher cognitive questions, and their students gave better answers to these questions. Several studies are currently in progress. As final reports become available, they can be obtained by writing the Teacher Education Program, Far West Laboratory for Educational Research and Development, 1 Garden Circle, Hotel Claremont, Berkeley, California. 94705[4]

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[4] Gall, p. 5.

AN OVERVIEW OF THE MINICOURSE MODEL

A Paper Prepared By

TEXAS INFORMATION SERVICES

The minicourses, products of the Far West Laboratory for Educational Research and Development, employ the process of microteaching for the inservice training of teachers. The minicourse involves a unique application of microteaching in that it is a self-contained package designed to be self-administered by the trainee without supervisory feedback.

The Far West Laboratory currently has five minicourses commercially available; seventeen others are in various developmental stages. Each minicourse addresses itself to a group of specific teaching skills which are broken down into behavioral components and grouped into instructional sequences. The minicourses are made up of filmed instructional lessons, filmed model teachers, handbooks, and evaluation sheets; microteaching is employed for trainee practice.

Each minicourse goes through the Far West Laboratory's development cycle before it is made available to the public. Perhaps the most noteworthy aspect of the cycle is that each minicourse undergoes three field tests before it reaches its final form.

The Major Steps in the Development Cycle[1]

1.	Research and Data Gathering	Includes review of literature, classroom observations, and preparation of report on the state of the art.
2.	Planning	Includes definition of skills, statement of objectives, determination of course sequence, and small-scale feasibility testing.
3.	Developing Preliminary Form of Product	Includes preparation of instructional and model lessons, handbooks, and evaluation devices.
4.	Preliminary Field Test	Conducted by Laboratory personnel in one, two, or three schools, using between six and twelve teachers. Includes collection and analysis of interview, observation, and questionnaire data.

[1] Walter R. Borg and others, *The Minicourse: A Microteaching Approach to Teacher Education*, p. 54.

5.	Main Product Revision	Revision of product as suggested by preliminary field test results.
6.	Main Field Test	Conducted by Laboratory personnel in between five and fifteen schools using between thirty and one hundred teachers. Includes collection of quantitative data on teachers' and pre- and post-course performances, usually in the form of classroom videotapes. Results are compared with course objectives.
7.	Operational Product Revision	Revision of product as suggested by the main field test results.
8.	Operational Field Test	Conducted by regular school personnel in between ten and thirty schools, using between forty and two hundred teachers. Includes collection and analysis of interview, observation, and questionnaire data.
9.	Final Product Revision	Revision of product as suggested by operational field test results.
10.	Dissemination and Distribution	Reports at professional meetings in journals, etc. Includes work with publisher who assumes commercial distribution, and monitoring of distribution to provide quality control.

MINICOURSE INSTRUCTIONAL SEQUENCE

Each minicourse is built around an instructional sequence which takes approximately one hour per day for three days:

1. *First day:* The trainee views an instructional film which presents the behaviorally defined skills to be learned. He then sees a film which illustrates these skills as they are used by a model teacher. He is asked that evening to prepare a short lesson (5-10 minutes) on a subject of his choosing in which he will practice these skills.

2. *Second day:* The trainee teaches his prepared lesson to a small group of students taken from his class. The microteaching session is recorded on videotape. After the lesson is completed, the students are sent back to the regular classroom, and the trainee replays the videotape of his lesson. He views the tape the first time without watching for any specific behavior (because he is probably unused to seeing himself on tape, he is allowed to watch once for "cosmetic effect" only). The teacher views the videotape a second time with an evaluation sheet on which he records exhibition of desired behavior. That evening he replans the lesson modifying it as his evaluation of his performance has indicated.

3. *Third day:* The trainee reteaches the revised lesson with a different group of pupils. He replays the tape first for general effect and then to evaluate his performance specifically. After his reteach evaluation is complete he may ask another teacher taking the minicourse (a teammate) to view the tape with him and offer suggestions for further improving his performance. This peer interaction is encouraged by the minicourse developers but is by no means mandatory. If the teacher prefers to view the final replay alone, he may.

Each minicourse consists of three to five instructional sequences. For example, *Minicourse I: Effective Questioning--Elementary Level* teaches twelve skills appropriate to conducting classroom discussions. There are four instructional sequences, each of which deals with three questioning skills.

CHANGES IN THE STANFORD PROCESS

If one compares the process used in the Stanford microteaching program (see TIS Analysis Paper, "Microteaching") with the minicourse instructional sequence, several differences are apparent. All the changes made by the developers of the minicourses were made in order to increase minicourse appropriateness for inservice training. All the changes are supported by research findings. There are three basic differences:

(1) The minicourse is a self-contained package. It does not require that a consultant or "expert" be present for training to take place. This aspect increases greatly the efficiency and flexibility of the minicourse as an inservice training device.

(2) There is no supervisory feedback used in the minicourse.

(3) Perceptual modeling (a visual example of the behavior in question), as well as symbolic modeling (a verbal description), is used in the minicourse.

(Feedback and modeling differences are discussed in the TIS Summary Paper, "Research Related to the Minicourse Model".)

REASONS FOR SUCCESS AND EFFECTIVENESS

The success of the minicourse and its effectiveness in changing teacher behavior are well documented by results of the field tests (Borg, *et al.*, 1970). Reasons for this effectiveness are many. Since the minicourse employs microteaching, all the advantages of this technique (see TIS analysis paper, "Microteaching") are closely related to minicourse effectiveness. In addition, implementation of research findings regarding (1) film techniques, (2) use of perceptual modeling, and (3) the technical-skills approach contribute to minicourse success.

One of the minicourse developers, Philip Langer (1969), attributes minicourse success mainly to the type of feedback the trainee receives. As he says, everyone enjoys seeing himself on television. This visual reinforcement becomes the stimulus leading to change as the teacher critiques his own performance. The second reason for success cited by Langer is perhaps the most important. Each skill taught in the minicourses is selected for its positive effect upon student learning. The teacher thus obtains continued reinforcement from student behavior change long after the course has ended. The practice of skills learned in the minicourse therefore makes permanent teacher change more probable.

Full citations for references in this paper may be found in the TIS bibliography, "Microteaching."

RESEARCH RELATED TO THE MINICOURSE MODEL

A TIS Summary of

Borg, Walter R.; and others. "Research Related to the Minicourse Model," *The Minicourse: A Microteaching Approach to Teacher Education*. Beverly Hills, Calif.: Macmillan Educational Services, Inc.; 1970. pp. 32-52.

NATURE OF SKILLS TAUGHT

An important aspect of the minicourse is its concentration upon specific rather than general teaching skills. This approach is directly opposite to the generalized programs which are defended with such statements as, "Teaching is an art," "There are as many teaching methods as there are teachers." The minicourse developers believe, on the contrary, that there are certain basic teaching skills that can be used in many teaching situations and should be part of the "professional equipment" of every teacher.

In order to make skills taught in the minicourses as specific as possible, one of the first steps in the development of each minicourse is to derive a set of behaviorally or operationally defined skills in a particular domain of classroom teaching (e.g., group discussions, tutoring). This approach, known as the "technical-skills approach," was developed by the Stanford Center for Research and Development in Teaching. The developers of the minicourse believe that for three reasons the technical-skills approach marks a significant advance in teacher education. (1) A vague exhortation telling a teacher what to do but not how to do it is difficult to translate into action. It is much easier for him to incorporate a behaviorally defined, technical skill into his classroom behavior. (2) The use of behaviorally defined skills makes reliable measuring of change in teacher behavior possible. (3) By working with technical skills, researchers can conduct more significant studies in the relationship between teacher behavior and pupil learning.

TYPE OF FEEDBACK

Most other microteaching programs rely heavily on feedback in the form of a supervisor's critique of the trainee's videotape. In contrast, the primary feedback in the minicourse program is provided through carefully structured teacher self-evaluation of videotape replays. The minicourse also employs filmed illustrations by model teachers rather than supervisory instruction to provide training in recognition and discrimination of skills to be learned.

Some research evidence raises serious doubts about the value of supervisory feedback. (Acheson, 1964). Tuckman and Oliver (1968) found that supervisor feedback resulted in a negative shift in teacher behavior, e.e., away from the direction suggested by the supervisor. On the other hand, research shows that the use of videotape replays as a source of feedback has, generally, a positive effect (Acheson, 1964). In the minicourse sequence, the teacher's own behavior becomes a stimulus leading to change. This process of self-evaluation should make the teacher more aware of his classroom behavior and thus enable him to continue evaluating and improving his teaching skills after the videotaping equipment is withdrawn.

USE OF PERCEPTUAL MODELING

The minicourse instructional method differs from that of other microteaching programs and most conventional inservice training programs in another important respect. While other programs rely on verbal instruction (symbolic modeling), a major portion of the minicourse instructional sequence is a filmed model teacher demonstrating the skills to be learned (perceptual modeling). Orme (1966) found that perceptual modeling consistently brought about greater changes in behavior than symbolic modeling.

FILM TECHNIQUES

The instructional and model films used in each instructional sequence have been constructed for maximum learning. Research indicates that simple camera and presentation techniques are just as effective as more elaborate (and expensive) filming (Ellery, 1959; Lumisdaine, 1958; Kanner and Rosenstein, 1960). Subtitles were found helpful in providing training in the recognition and discrimination of behaviors (Northup, 1952). Films that require active viewing, those that insert questions to be followed by viewer response and immediate feedback, significantly increase learning (Lumisdaine and Gladstone, 1958; Johnson, 1968). Experiments were also conducted to determine the effect of the difficulty of film commentary on learning (Gladstone, 1958). It was generally found that commentary that was simple and easy to understand resulted in significantly greater learning. Therefore, minicourse films use simple commentary, identifying subtitles, and questions that stimulate active participation by the viewer.

Full citations for references in this paper may be found in the TIS Bibliography on "Microteaching."

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MICROTEACHING

An Analysis Paper Prepared by
TEXAS INFORMATION SERVICE

DEFINITION

Microteaching may be most succinctly defined as a teaching situation which is scaled down in terms of lesson time and number of pupils. Usually this means four- to twenty-minute lessons for three to ten pupils. Frequently the microteaching session is followed by immediate feedback from video- or audiotape replays, supervisors, pupils, colleagues, or self-perception. Some variable aspects of the microteaching technique include lesson length, number of reteaches (after feedback), amount and kind of supervision, the use of video- or audiotape recordings or neither, and the number and types of pupils.

DEVELOPMENT

The microteaching concept was developed at Stanford University as a School of Education preservice training device. It began with a simulated demonstration lesson; one student "taught" a brief lesson to several fellow students who acted as "pupils." The technique was modified to become a short practice lesson using "real" pupils which the prospective teacher actually taught. Finally, the teaching techniques dimension was introduced. The developers of the program found that in this manner skills could be added one at a time to an individual's repertoire, thus increasing his versatility and flexibility in the classroom. Microteaching has since been used extensively in inservice as well as preservice programs as a device for improving teaching techniques.

THE STANFORD MODEL

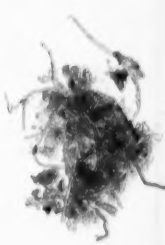
The Stanford University preservice microteaching program involves the following process:

1. A set of specific teaching skills is studied by the intern.
2. The intern attempts to apply these skills in a short lesson (5-10 minutes) with four to five pupils.
3. The lesson is recorded on videotape and the intern watches a replay immediately after completing the lesson.
4. During the replay his supervisor gives the intern specific feedback on his performance.
5. The intern then replans and reteaches the lesson.

ADVANTAGES

When compared to the usual pre- and inservice training program microteaching is advantageous in several respects:

1. Specific rather than general skills are taught.
2. The teacher learns through direct experience, by doing rather than by listening.
3. The small group and short lesson provide an encouraging environment for teacher change.
4. The teacher gets immediate feedback from videotape replays or supervisor critiques.
5. The teacher gets immediate reinforcement from his own performance, revising and reteaching the lesson, and noting changes in pupil behavior.



RATIONALE

Rationales for the use of microteaching as a teacher training device have been set forth by several authors;

1. Microteaching involves training through actual experience. It is *real teaching* with real pupils. (Allen and Ryan, 1969).

2. The microteaching process *reduces the complexities* of normal classroom teaching. This allows the teacher to concentrate on the acquisition of specific skills. (Allen and Ryan, 1969).

3. Through the feedback portion of the microteaching process, the teacher and/or supervisor *acquires direct, objective information* about the performance. (Meier, 1968).

4. The microteaching process *allows for the trainee's capacities*. He may select the content of the lesson from the area of his greatest competence. (Meier, 1968).

5. The use of microteaching *permits greater control* over the trainee's environment with regard to pupils, methods of feedback, supervision, etc. (Allen and Ryan, 1969).

6. Microteaching, because of the short time span and few pupils, is a *low threat situation* in which to practice teaching skills. (Allen and Clark, 1967).

7. A microteaching encounter constitutes a *low risk situation* for both teacher and pupils. Since this small group is not part of the regular class activity, the pupils are not under pressure to learn. The teacher need not fear failure for the same reason. (Allen and Clark, 1967).

8. The *active participation* that microteaching makes possible provides the trainee with an opportunity to perfect skills before taking them to the classroom. (Meier, 1968).

9. Microteaching allows for the repetitive practice needed to *overlearn skills* that will be used in teaching. (Meier, 1968).

10. Most microteaching programs incorporate *spaced or distributed practice* of a skill over a period of time. This kind of practice makes learning more thorough. (Meier, 1968).

RESEARCH BASIS FOR MICROTEACHING

Transfer of Skills Learned Through Microteaching

Research evidence indicates that skills learned in the microteaching environment transfer to a significant degree to the regular classroom and persist for several months with little or no regression (Borg, *et al.*, 1968 a&b). Bush (1966) found that performance in a microteaching situation can accurately predict subsequent classroom performance.

Effectiveness Compared to Other Training Programs

Research evidence shows that microteaching achieves changes in teacher behavior more rapidly than does student teaching or intern teaching (Kallenback and Gall, 1968).

Cumulative Nature of Skills Learned Through Microteaching

According to Borg's (1969) research, the microteaching format of teach-critique/reteach-critique can bring about positive changes in teacher behavior. These behavioral changes accumulate to result in a larger repertoire of teaching skills.

Feedback

Research indicates that the feedback dimension is probably the crucial one in changing behavior. While the immediacy of feedback is apparently not crucial in some instances, it does seem beneficial in many cases. Since the trainee is unlikely to remember for long the details of his performance, immediacy is important if the feedback is provided in the form of a supervisor's or observer's comments. If, however, the session is videotaped, it may be "recreated" at any time; videotape feedback thus need not be immediate. The most powerful form of feedback seems to be a combination of supervisor comment, videotape replay, and pupil feedback. (Berliner, 1969).

The Instructional Model

In order to present the trainee with an example of the teaching skill he is asked to exhibit, microteaching programs customarily employ symbolic and/or perceptual models. The symbolic model is a verbal description of desired behavior while the perceptual model is an actual visual example (usually a filmed or live model teacher). Research shows that for certain skills a perceptual

model is more effective in causing change in teaching behavior, while in other cases evidence is inconclusive. (Orme, 1966). Perceptual modeling may have no advantages over symbolic modeling in instruction dealing with skills that can be easily described. It was proved, however, that a perceptual model that demonstrates positive instances of desired behavior, rather than a mixture of positive and negative instances is more powerful in enhancing a trainee's ability to acquire the skill. (Berliner, 1969).

TEACHING SKILLS

Listed below are fifteen identified teaching skills which have been analyzed into component behaviors. Training procedures which use a microteaching format have been developed for each skill. (The list is taken from *PREP-17, Microteaching*).

1. Fluency in Asking Questions. The emphasis is on the teacher asking as many questions as possible during the lesson. This skill is practiced in order to develop a new teaching pattern in the classroom for the teacher who tends to depend too heavily on the lecture method. Having achieved this goal, emphasis can be placed on higher order or divergent questions.

2. Probing Questions. Probing requires that teachers ask questions that require pupils to go beyond superficial "first-answer" questions. This can be done by asking pupils for more information and/or meaning; requiring the pupil to rationally justify his response; refocusing the pupil's or class's attention on a related issue; prompting the pupil or giving him hints; and bringing other students into the discussion by getting them to respond to the first student's answer.

3. Higher Order Questions. Higher order questions are defined as questions which cannot be answered from memory or simple sensory description. They call for finding a rule or principle rather than defining one. The critical requirements for a "good" classroom question is that it prompts students to use ideas rather than just remember them. Although some teachers intuitively ask questions of high quality, far too many over-emphasize those that require only the simplest cognitive activity on the part of the students. Procedures have been designed to sensitize beginning teachers to the effects of questioning on their students and to provide practice in forming and using higher order questions.

4. Divergent Questions. These questions are characterized by the fact that there are no "correct" answers. They are usually open-ended questions. They require the students to think creatively, to leave the comfortable confines of the known, and to reach out into the unknown. They ask students to make hypotheses and use their imaginations to reorganize concepts into novel patterns.

5. Reinforcement. An incentive skill used by the teacher to reward students for proper behaviors. The skill focuses on the teacher's use of positive reinforcement to increase student participation in classroom discussions.

6. Recognizing Attending Behavior. A skill designed to sensitize and alert the teacher to what is going on in his classroom by observing the cues his students present. By observing their facial expressions, body postures, activity- or non-activity- directed behaviors, and conversations, the teacher can tell a great deal about their interest level and attention span. From these cues the teacher can make judgments about whether to continue the activity, change it, slow down, speed up, or use a different mode of instruction. Recognizing student attending behavior is a prerequisite for almost any kind of classroom instructional or management decision.

7. Silence and Nonverbal Cues. This skill is designed to allow the teacher to control and direct classroom discussions without talking. Nonverbal communication is one of the most neglected means of teacher-student communication, but one of the most powerful. The skill focuses on the controlled use of teacher silence to get students to speak and on techniques of nonverbal communication.

8. Cueing. This skill is designed to give the teacher much more control over the success experience a student has in answering a question or in making a comment. By cueing him ahead of time and through the kinds of cues given, the teacher can greatly increase his chances of making a worthwhile contribution to the class.

9. Set Induction. This skill is concerned with properly preparing students for some upcoming activity. It includes an interesting and/or novel way of introducing the activity and establishing common frames of reference between the teacher and students in order to facilitate communication. It is basically an initiating activity by the teacher.

10. Stimulus Variation. This skill deals with both verbal and nonverbal techniques of stimulating students in order to preclude boredom and apathy in the classroom. It is basically concerned with the teacher varying his behaviors in order to keep the students attentive and alert.

11. Closure. This skill is complimentary to set induction. It consists of teacher activities that will help the students perceive a logical organization of the main ideas and pieces of factual information presented in the lesson. In addition to pulling together the major points and acting as a cognitive link between past knowledge and new knowledge, closure provides the pupil with a needed feeling of achievement.

12. Lecturing. Training in some of the successful techniques of lecturing is the focus for this skill. Delivery techniques, use of audiovisual materials, set induction, pacing, closure, planned repetition, and other skills related to lecturing are included. Rather than saying that lecturing is bad as an instructional technique, this skill tries to consider when it is effective to lecture and how to lecture effectively.

13. Use of Examples. The use of examples is basic to good, sound, clear teaching. Examples are necessary to clarify, verify, or substantiate concepts. Both inductive and deductive uses of examples can be used effectively by the teacher. Effective use of examples includes starting with simple examples relevant to students' experience and knowledge; relating the examples to the principles or ideas being taught; checking to see if the objectives of the lesson have been achieved by asking students to give examples which illustrate the main point; using analogies and metaphors to relate the unknown with the known or to liven up the examples.

14. Planned Repetition. The purpose of this skill is to clarify and reinforce major ideas, key words, principles, and concepts in a lecture or discussion. The use of planned repetition is a powerful technique in focusing and highlighting important points and in describing them from different points of view. Improper use of this skill can cause confusion and poor learning among students, while proper use can direct their attention to points which the teacher wishes to emphasize. The skill focuses on techniques of literal repetition--simple repetition, spaced repetition, cumulative repetition, and massed repetition.

15. Completeness of Communication. Although the importance of and need for clear communication are blatant, clarity is not often the guiding principle in actual communication. Sensitivity training on the importance, and the difficulty of being understood is the focus of this skill. A classroom game has been devised which dramatically demonstrates to teachers that what they consider to be clear instructions are often not clear at all to the students. Sensitivity training in the skill of communicating with others will hopefully produce teachers who are more responsive to possible miscommunication.

USES OF MICROTEACHING

Inservice Training

Several uses of microteaching for inservice teachers include microteaching (1) as a tool for improving teaching skills, (2) as a trail framework for team presentations, (3) as a site for ascertaining the proper instructional level of materials, (4) for pre-employment prediction, and (5) for training supervisors to evaluate beginning teachers.

Preservice Training

One of microteaching's major uses to date has been in training student or intern teachers.

Microcounseling

A process was developed at Colorado State College, Greeley, which allows trainees to systematically practice counseling skills such as attending behavior.

Supervisor Training

A clinic at Whitman College, Walla Walla, Washington, proved microteaching worthwhile for supervisor training in many skills.

Training College Teachers

A professor at the University of Illinois found microteaching helpful in assisting college teachers.

Peace Corps Training

Microteaching has proven effective and efficient in accelerated Peace Corps teacher-training programs.

LIMITATIONS

Although microteaching appears to be a promising device for training teachers in a number of classroom skills, it should not be taken as a panacea for all teaching problems. Listed are some limitations of microteaching in its current form.

1. Microteaching does not provide the teacher with training in the *appropriate use of identified skills*. Simply increasing exhibitions of a behavior will not make one an excellent teacher. Rather, successful teaching depends upon an orchestration of many skills. (Borg, *et al.*, 1970).

2. The *value of identified teaching skills* to be increased through microteaching must be clearly established. That teachers can be trained to acquire certain behaviors is known, but little information exists regarding how these behaviors affect pupils. (Cooper and Allen, 1970).

3. No information concerning the *optimal learning sequence* for the various skills is presently available. This sequence may even vary greatly from trainee to trainee. (Cooper and Allen, 1970).

4. *Skills need to be systematically identified.* Those teaching skills identified to date have been named in a rather haphazard fashion (Cooper and Allen, 1970).

Content of this paper is based primarily upon:

Allen, Dwight W.; Cooper, James M. *Microteaching: History and Present Status.*
ED 036 471

Allen, Dwight W.; Cooper, James M. *Microteaching PREP-17.*
ED 041 190

Borg, Walter R. *The Effects of Videotape Feedback and Microteaching in a Teacher Training Model.*

References throughout this paper are to the "Bibliography on Microteaching" included in this package.

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EQUIPMENT FOR A MICROTEACHING INSTALLATION
Prepared By Texas Information Service

Videotaping equipment has been used in most microteaching programs. At least one camera, one microphone, and replay equipment are necessary. Available in portable models, the equipment can be shared by schools to make model films of teaching performances by master teachers as well as to record trainees' microteaching sessions.

Other equipment which might be needed in a microteaching program is already available in most schools: movie, filmstrip, and overhead projectors; file cabinets; and storage cabinets.

If videotaping equipment is not available, microteaching may still take place. A 35mm. camera may be used if a pictorial record is desired. However, microteaching programs that do not employ a pictorial record of any kind have been used with some success. Audiotape recordings of microteaching sessions could possibly provide as useful a record as videotaping for lessons concentrating on primarily verbal skills.

This is a *basic list of equipment* needed for videotape recording in a microteaching program. A 16mm. projector and screen should be part of any school's equipment, but they are listed to give a total picture. Also, each project should have two videotape recorders: should equipment fail, the participant may still proceed.

Projector 16mm., Bell & Howell	$ 550.00
Portable screen on tripod	50.00
TV camera, viewfinder w/zoom lens (possibly wide-angle lens in small room situation) GBA camera	900.00
Camera tripod w/dolly, and spring head Houston	150.00
Microphones. Sienheiser @ 85.00	170.00
Microphone mixer. Shure M-68	75.00
Video recorders. Ampex model 5100 @ 1,600.00	3,200.00
Educational TV receiver-monitor RCA model	165.00
Stand for TV receiver-monitor	35.00
Cart for VTR w/attached cord. Bretford 42E	35.00
Miscellaneous cables and connectors for above	25.00
Flood lights w/clamp type holders, extension cords, miscellaneous items-repair tools, cleaning, etc.	50.00
Video tape 1" size, 1 hour per reel Ampex or Memorex $50.00 per 60 minute reel	500.00
Portable TV receiver-monitor Sony VM-9	175.00

(The above are 1969-1970 prices. This list appears in *PREP-17, Microteaching.*)

For additional information on equipment used in microteaching consult the following:

Babin, Patrick. "Student's Guide to Microteaching." Ontario: University of Ottawa, Center for Cybernetic Studies, 1969 ED 033 918.

This is a manual of microteaching lessons used at the Ottawa Microteaching Clinic. The manual also includes evaluation sheets for each lesson, instruction in behavioral objectives, general information on microteaching, and technical suggestions (such as the use of a 35mm. camera if a videotape is not available).

Bosley, Howard E., and others. *Video Processes in Teacher Education Programs: Scope, Techniques, and Assessment.* Multi-State Teacher Education Project, Monograph III. Baltimore: The Project, September 1968. ED 025 458.

Although much of the information in this monograph is aimed at the college teacher, there is very specific information about cost and availability of microteaching equipment, and transferring videotape recordings to super 8mm. cartridge.

Hoehn, Lilburn P., ed. *Teaching Behavior Improvement Program.* Detroit: Michigan-Ohio Regional Educational Laboratory, July 1969. ED 034 719.

This document is intended to be used by those wishing to implement an inservice teacher self-improvement program. The document includes a history of 2 years of field testing in real school situations, factors of concern to a leader, and lists of materials and manuals.

Meier, John and Gerald Brudenell. *Report: Remote Training of Early Childhood Educators.* Greeley: Colorado State College, Institute for Child Study, July 1968. ED 027 262.

This report details the training of teachers in their home schools across seven states by the Institute Staff in Colorado. Included are trainee's orientation to microteaching and equipment management.

Perlberg, Arye, and others. "The Use of Portable Video Tape Recorders and Microteaching Techniques to Improve Instruction in Vocational Technical Programs in Illinois." A Pilot Study. Final Report. Studies One and Two. Urbana: University of Illinois, Department of Vocational and Technical Education, 1968. ED 028 253.

Discussed in this pilot study are technical details for using microteaching equipment, including a description of housing units, supplies, maintenance, equipment positioning in the classroom and laboratory, and camera techniques. Also included is information and, in some cases, illustrations on the training of operators, problems, misuse of equipment, the making of model tapes, and how to set up mobile and portable video centers.